1419901000

Doc#: 1419901000 Fee: $576.00
RHSP Fee:$9.00 RPRF Fee: $1.00
Karen A.Yarbrough
Cook County Recorder of Deeds
Date: 07/18/2014 09:41 AM Pg: 1 of 270

D1116983
Schlee

This instrument was prepared by:

Name: Vincent S. Oleszkiewicz
Address: Leech Tishman Fuscaldo & Lampl, LLC
4225 Naperville Road, Suite 230
Lisle, IL 60532
(630) 536-1172

Please return this instrument to:

Name: Vincent S. Oleszkiewicz
Address: Leech Tishman Fuscaldo & Lampl, LLC
4225 Naperville Road, Suite 230
Lisle, IL 60532
(630) 536-1172

ENVIRONMENTAL COVENANT

1. This Environmental Covenant is made this 8th day of July, 2014, by and among Standard Bank & Trust Co., as Trustee under Illinois Land Trust No. 21032, dated May 18, 2011 (Grantor) and the Holder/Grantee further identified in paragraph 3 below pursuant to the Uniform Environmental Covenants Act, 765 ILCS Ch. 122 (UECA) for the purpose of subjecting the Property to the activity and use limitations described herein.

2. **Property and Grantor**.

A. Property. The real property subject to this Environmental Covenant is located at 164 E. Grand Avenue, in Chicago, Cook County, Illinois, and is legally described in Exhibit A, hereinafter referred to as the "Property." The county parcel identification numbers for this Property are 17-10-122-016-0000 and 17-10-122-017-0000.

B. Grantor. Standard Bank & Trust Co., as Trustee under Illinois Land Trust No. 21032, dated May 18, 2011 is the current fee owner of the Property and is the "Grantor" of this Environmental Covenant. The mailing address of the Grantor is:

270

Jose Maldonado, President
Old Veteran Construction, Inc.
10942 South Halsted
Chicago, IL 60628

3. Holder (and Grantee for purposes of indexing).

A. Illinois EPA is a Holder (and Grantee for purposes of indexing) of this Environmental Covenant pursuant to its authority under Section 3(b) of UECA. The mailing address of the Illinois EPA is 1021 N. Grand Avenue East, P.O. Box 19276, Springfield, IL 62794-9276.

B. Standard Bank & Trust Co., as Trustee under Illinois Land Trust No. 21032, dated May 18, 2011 is a Holder (and Grantee for purposes of indexing) of this Environmental Covenant pursuant to UECA. The mailing address of Standard Bank & Trust Co., as Trustee under Illinois Land Trust No. 21032, dated May 18, 2011 is the same as in paragraph 2.B. above. Regardless of any future transfer of the Property, Standard Bank & Trust Co., as Trustee under Illinois Land Trust No. 21032, dated May 18, 2011 shall remain a Holder of this Environmental Covenant.

4. Agencies. The Illinois EPA and the U.S. EPA are "Agencies" within the meaning of Section 2(2) of UECA. The Agencies have approved the environmental response project described in paragraph 5 below and may enforce this Environmental Covenant pursuant to Section 11 of UECA.

5. Environmental Response Project and Administrative Record.

A. This Environmental Covenant arises under an environmental response project as defined in Sections 2(5)(B) and (D) of UECA.

B. The Property has been designated the Lindsay Light II Operable Unit 20 Site (OU 20) and is part of the Lindsay Light II Site. The Lindsay Light II Site currently has 20 operable units. The Property, OU 20 has undergone environmental remediation pursuant to an Administrative Settlement Agreement and Order on Consent for Removal Action in *In the Matter of Lindsay Light II Operable Unit 20, Chicago, IL*, Docket No. V-W-13-C-002 ("Consent Order"), issued under the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §§ 9604 *et. seq.* ("CERCLA") Sections 104, 106(a), 107, and 122. A copy of the Consent Order is attached as Exhibit B.

In 2013, Grantor completed all Work at OU 20 as defined in Section III of the Consent Order and required by Section VIII of the Consent Order including radiologically screening portions of the Site in 18-inch lifts to identify soil in excess of the clean-up criteria of 7.1 picocuries per gram (pCi/g) total radium. Grantor performed this Work pursuant to the EPA-approved Work Plan attached as Exhibit C. Grantor did not radiologically screen the entire OU 20 Site because it did not undertake construction excavation at all portions of the OU 20 Site. In addition, actual thorium-contaminated Waste Material was left in place at the OU 20 Site to

avoid potenitially undermining the on-site building footings and the adjacent City sidewalk. The unscreened areas and the areas where actual thorium-contaminated Waste Material was left in place are depicted on the Map of the Uninvestigated Site Area attached as Exhibit E U.S. EPA issued a Completion Letter dated February 7, 2014, which is attached as Exhibit D. The Consent Order at Section X requires Institutional Controls in the form of an Environmental Covenant if, upon completion of the Work required under the Consent Order, any portion of the OU 20 Site is not radiologically surveyed in 18-inch lifts or actual thorium-contaminated Waste Material is left in place at the Site.

This Environmental Covenant shall operate to fulfill the requirements of Section X of the Consent Order which requires a Deed Restriction/Institutional Control Document to apply to any portion of the Site that is not radiologically surveyed in 18-inch lifts and to the area of the Site where actual thorium-contaminated Waste Material was left in place. The Activity and Use Limitations described in paragraph 7 below are required to protect construction laborers, utility workers and the public that may be exposed to elevated levels of thorium if any portion of the OU 20 Site that was not radiologically surveyed in 18-inch lifts, or the area that contains actual thorium-contaminated Waste Material, is ever excavated without the proper radiation monitoring and management and disposal of radioactively contaminated materials.

C. Grantor wishes to cooperate fully with the Agencies in the implementation, operation, and maintenance of the terms of this Environmental Covenant at the OU 20 Site.

D. The Administrative Record for the response actions at the OU 20 Site (including the environmental response project at the Property) is maintained at the U.S. EPA Superfund Record Center, 7th Floor, 77 West Jackson Boulevard, Chicago, Illinois 60604.

6. **Grant of Covenant. Covenant Runs With The Land**. Grantor creates this Environmental Covenant pursuant to UECA so that the Activity and Use Limitations, and associated terms and conditions set forth herein shall "run with the land" in accordance with Section 5(a) of UECA and shall be binding on Grantor, its heirs, successors and assigns, and on all present and subsequent owners, occupants, lessees or other persons acquiring an interest in the Property (each an "Owner").

7. **Activity and Use Limitations**. The following Activity and Use Limitations apply to the use of the Property:

A. The Consent Order refers to "Uninvestigated Site Area" which includes any portion of the Site which is not radiologically surveyed in 18-inch lifts or any portion of the site where actual thorium-contaminated Waste Material will remain in place after completion of the Work.

B. Grantor has attached hereto and submitted to U.S. EPA the legal description (Exhibit A) and a scaled Site map with survey grade coordinates and elevations of the Uninvestigated Site Area (Exhibit E) documenting and demonstrating those areas of the Site which were not investigated in 18-inch lifts and the area of the Site where actual thorium-contaminated Waste Material has been left in place.

C. Except as provided in the Work Plan or another work plan approved in writing by U.S. EPA, disturbing, exposing and intruding upon soils in the Uninvestigated Site Area is prohibited.

D. Prior to disturbing, exposing or intruding upon the soils in the Uninvestigated Site Area, the current Owner at the time of the proposed soil disturbance, exposure or intrusion shall notify U.S. EPA both by telephone and in writing of plans to work in the Uninvestigated Site Area at least 72 hours prior to (but no more than 21 calendar days in advance of) commencing such activities. When material containing total radium (Ra-226 +Ra-228) exceeding 7.1 pCi/g is identified, the Owner at that time shall provide a letter report to U.S. EPA explaining how work was conducted in accordance with the Work Plan within 60 days of completion of the work.

E. When soils are disturbed, exposed or intruded upon in the Uninvestigated Area the current Owner must conduct radiation monitoring in accordance with the Work Plan or a work plan approved in writing by U.S. EPA. If radioactive material is encountered the current Owner must manage and dispose of any radioactive material in accordance with the Work Plan or a work plan approved in writing by U.S. EPA.

8. **Right of Access**. Grantor consents to officers, employees, contractors, and authorized representatives of the Holder and U.S. EPA entering and having continued access at reasonable times to the Property for the following purposes:

A. Implementing, operating and maintaining the environmental response project described in paragraph 5 above;

B. Monitoring and conducting periodic reviews of the environmental response project described in paragraph 5 above including without limitation, sampling of air, water, groundwater, sediments and soils;

C. Verifying any data or information submitted to U.S. EPA or Illinois EPA by Grantor and Holders; and

D. Verifying that no action is being taken on the Property in violation of the terms of this instrument, the environmental response project described in paragraph 5 above or of any federal or state environmental laws or regulations;

Nothing in this document shall limit or otherwise affect U.S. EPA's rights of entry and access or U.S. EPA's and Illinois EPA's authority to take response actions under CERCLA, the National Contingency Plan (NCP), RCRA or other applicable federal and state laws.

9. **Reserved rights of Grantor**. Grantor hereby reserves unto itself, its successors, and assigns, including heirs, lessees and occupants, all rights and privileges in and to the use of the Property which are not incompatible with the Activity and Use Limitations identified herein.

10. **No Public Access and Use**. No right of access or use by the general public to any portion of the Property is conveyed by this instrument.

11. **Future Conveyances, Notice and Reservation**.

A. Grantor or transferee, if applicable, shall include in any future instrument conveying any interest in any portion of the Property, including but not limited to deeds, leases and mortgages, a notice and reservation which is in substantially the following form:

> **THE INTEREST CONVEYED HEREBY IS SUBJECT TO AND GRANTOR SPECIFICALLY RESERVES THE ENVIRONMENTAL COVENANT EXECUTED UNDER THE UNIFORM ENVIRONMENTAL COVENANTS ACT (UECA) AT 765 ILCS CH. 122 RECORDED IN THE OFFICIAL PROPERTY RECORDS OF COOK COUNTY, ILLINOIS ON _____ AS DOCUMENT NO. _____, IN FAVOR OF AND ENFORCEABLE BY GRANTOR AS A UECA HOLDER, THE ILLINOIS ENVIRONMENTAL PROTECTION AGENCY AS A UECA HOLDER AND THE U.S. ENVIRONMENTAL PROTECTION AGENCY AS A UECA AGENCY.**

B. Grantor or transferee, if applicable, shall provide written notice to Illinois EPA and U.S. EPA within ten (10) business days after each conveyance of an interest in the Property or any portion thereof. The notice shall include the name, address, and telephone number of the transferee, a copy of the deed or other documentation evidencing the conveyance, and a survey map that shows the boundaries of the property being transferred.

12. **Enforcement and Compliance**.

A. Civil Action for Injunction or Equitable Relief. This Environmental Covenant may be enforced through a civil action for injunctive or other equitable relief for any violation of any term or condition of this Environmental Covenant, including violation of the Activity and Use Limitations under Paragraph 7 and denial of Right of Access under Paragraph 8. Such an action may be brought individually or jointly by:

i. the Illinois Environmental Protection Agency;
ii. the Holders of the Environmental Covenant; and
iii. U.S. Environmental Protection Agency.

B. Other Authorities Not Affected. No Waiver of Enforcement. All remedies available hereunder shall be in addition to any and all other remedies at law or in equity, including CERCLA. Nothing in this Environmental Covenant affects Illinois EPA's or U.S. EPA's authority to take or require performance of response actions to address releases or threatened releases of hazardous substances or pollutants or contaminants at or from the Property, or to enforce the Consent Order. Enforcement of the terms of this instrument shall be at the discretion of the Holders, the U.S. EPA, and Illinois EPA, and any forbearance, delay or omission to exercise its rights under this instrument in the event of a breach of any term of this instrument shall not be deemed to be a waiver by the Holders, U.S. EPA or Illinois EPA of such term or of any subsequent breach of the same or any other term, or of any of the rights of the Holders, U.S. EPA or Illinois EPA.

C. **Former Owners And Interest Holders Subject to Enforcement.** An Owner, or other person that holds any right, title or interest in or to the Property, remains subject to enforcement with respect to any violation of this Environmental Covenant by the Owner or other person which occurred during the time when the Owner or other person was bound by this Environmental Covenant regardless of whether the Owner or other person has subsequently conveyed the fee title, or other right, title or interest, to another person.

13. **Waiver of Certain Defenses**. This Environmental Covenant may not be extinguished, limited, or impaired through issuance of a tax deed, foreclosure of a tax lien, or application of the doctrine of adverse possession, prescription, abandonment, waiver, lack of enforcement, or acquiescence, or similar doctrine as set forth in Section 9 of UECA.

14. **Representations and Warranties**. Grantor hereby represents and warrants to the Illinois EPA, U.S. EPA and any other signatories to this Environmental Covenant that, at the time of execution of this Environmental Covenant, that the Grantor is lawfully seized in fee simple of the Property, that the Grantor has a good and lawful right and power to sell and convey it or any interest therein, that the Property is free and clear of encumbrances other than those described on Exhibit F hereto, and that the Grantor will forever warrant and defend the title thereto and the quiet possession thereof. After recording of this instrument, Grantor will provide a copy of this Environmental Covenant to all holders of record of the encumbrances including those entities noted on Exhibit F.

15. **Amendment or Termination**. Except the Illinois EPA and U.S. EPA, all Holders and other signers waive the right to consent to termination of the Environmental Covenant. This Environmental Covenant may be amended by consent only if the amendment is signed by the Illinois EPA, U.S. EPA and the then current owner of the fee simple of the Property, unless waived by the Agencies. If Grantor no longer owns the Property at the time of proposed amendment or termination, Grantor waives the right to consent to an amendment or termination of the Environmental Covenant. U.S. EPA together with Illinois EPA may terminate this Environmental Covenant, in whole or in part, in writing, as authorized by law. If requested by the U.S. EPA and Illinois EPA, such writing will be executed by the the then current property owner in recordable form and recorded with the Recorder of Deeds, Cook County, Illinois. The then current owner of the property may only modify or terminate the requirements of the Environmental Covenant and the above restrictions in whole or in part, in writing, with the prior written approval of U.S. EPA and Illinois EPA. The then current owner of the property may seek to modify or terminate, in whole or in part, the restrictions by submitting to U.S. EPA and Illinois EPA, for approval, a written application that identifies each such term and restriction to be terminated or modified, describes the terms of each proposed modification and includes proposed revision(s) to the Environmental Covenant. Each application for termination or modification of any restriction shall include a demonstration that the requested termination or modification will not interfere with, impair or reduce protection of human health and the environment. If U.S. EPA together with the Illinois EPA makes a determination that an application satisfies the requirements of this Paragraph, including the criteria specified above, U.S. EPA will notify the then current property owner in writing. If U.S. EPA does not respond in writing to a request to change land use within 90 days of its receipt of that request, unless Grantor agrees to extend this period beyond 90 days, U.S. EPA and Illinois EPA may be deemed to have denied the request. If a modification to or termination of restriction is approved, the then

current property owner shall record the revised Environmental Covenant as approved by U.S. EPA and Illinois EPA, with the Recorder of Deeds, Cook County, Illinois and shall send copies to all parties in accordance with Paragraph 17.C.

16. **Notices**. Except for the annual electronic compliance reporting required in Paragraph 18.A. below, any notice, demand, request, consent, approval, or communication that either party desires or is required to give to the other shall be in writing and shall either be served personally or sent by first class mail, postage prepaid, addressed as follows:

To Grantor:

Jose Maldonado, President
Old Veteran Construction, Inc.
10942 South Halsted
Chicago, IL 60628

To Holder:

Jose Maldonado, President
Old Veteran Construction, Inc.
10942 South Halsted
Chicago, IL 60628

To Agencies:

Kim Geving, Assistant Counsel
Illinois Environmental Protection Agency
1021 N. Grand Avenue East
P.O. Box 19276
Springfield, IL 62794-9276

U.S. Environmental Protection Agency
Superfund Division Director
77 West Jackson Boulevard
Chicago, IL 60604

17. **Recording and Notice of Environmental Covenant, Amendments and Termination**.

A. **The Original Environmental Covenant.** An Environmental Covenant must be recorded in the Office of the Recorder or Registrar of Titles of the county in which the property that is the subject of the Environmental Covenant is located. Within 30 days after the Illinois EPA and U.S. EPA (whichever is later) sign and deliver to Grantor this Environmental Covenant, the Grantor shall record this Environmental Covenant in the office of the County Recorder or Registrar of Titles for the County in which the Property is located.

B. **Termination, Amendment or Modification.** Within 30 days after Illinois EPA and U.S. EPA (whichever is later) sign and deliver to Owner any termination, amendment or

modification of this Environmental Covenant, the Owner shall record the amendment, modification, or notice of termination of this Environmental Covenant in the office of the County Recorder or Registrar of Titles in which the Property is located.

C. Providing Notice of Covenant, Termination, Amendment or Modification. Within 30 days after recording this Environmental Covenant, the Grantor shall transmit a copy of the Environmental Covenant in recorded form to:

i. the Illinois EPA;
ii. the U.S. EPA;
iii. each person holding a recorded interest in the Property;
iv. each person in possession of the Property; and
v. the City of Chicago Department of Law.

Within 30 days after recording a termination, amendment or modification of this Environmental Covenant, the Owner shall transmit a copy of the document in recorded form to the persons listed in items i to v above.

18. Compliance Reporting.

A. The Owner shall submit to Illinois EPA and U.S. EPA on an annual basis an electronic mail notice confirming compliance with the Activity and Use Limitations provided in Paragraph 7. The electronic mail notice shall be submitted to Kim Geving at Kim.Geving@Illinois.gov and to both r5_sfrecords@epa.gov and r5webmaster@epa.gov or other subsequent electronic mail address as instructed by Illinois EPA and/or U.S. EPA. The electronic mail subject line shall include "Lindsay Light II Site OU 20." The electronic mail shall be submitted on an annual basis on the date of recording of this instrument whether or not Grantor, its contractors, representatives or agents have disturbed, exposed or intruded upon soils in the Uninvestigated Site Area.

Additionally, the Owner shall include in the annual notice of compliance: 1) a request to IEPA and U.S. EPA for confirmation of submission via reply electronic mail and 2) the following certification statement:

"I certify under penalty of law that the specific Activity and Use Limitations identified in Paragraph 7 of the Uniform Environmental Covenant for the Property remain in place. I am aware that any person who knowingly makes a false, fictitious, or fraudulent material statement to the Illinois EPA, either orally or in writing, commits a Class 4 felony. A second or subsequent offense after conviction is a Class 3 felony (415 ILCS 5/44(h)(8))."

The above certification statement shall be submitted via electronic mail to the above addresses and include a valid electronic signature.

B. Owner also shall notify the Illinois EPA and U.S. EPA in writing as soon as possible of any actions or conditions that would constitute a breach of the Activity and Use Limitations in Paragraph 7.

19. General Provisions.

A. Controlling law. This Environmental Covenant shall be construed according to and governed by the laws of the State of Illinois and the United States of America.

B. Liberal construction. Any general rule of construction to the contrary notwithstanding, this instrument shall be liberally construed in favor of the establishment of activity and use limitations that run with the land to effect the purpose of this instrument and the policy and purpose of the environmental response project and its authorizing legislation. If any provision of this instrument is found to be ambiguous, an interpretation consistent with the purpose of this instrument that would render the provision valid shall be favored over any interpretation that would render it invalid.

C. No Forfeiture. Nothing contained herein will result in a forfeiture or reversion of Grantor's title in any respect.

D. Joint Obligation. If there are two or more parties identified as Grantor herein, the obligations imposed by this instrument upon them shall be joint and several.

E. Captions: The captions in this instrument have been inserted solely for convenience of reference and are not a part of this instrument and shall have no effect upon construction or interpretation.

20. Effective Date. This Environmental Covenant is effective on the date of acknowledgement of the signature of the Illinois EPA and U.S. EPA, whichever is later.

21. List of Exhibits.

Exhibit A – Legal Description of the Property
Exhibit B – Consent Order
Exhibit C – USEPA Approved Work Plan
Exhibit D – Completion Letter
Exhibit E – Map of Uninvestigated Site Area
Exhibit F – Title Policy

[Signature Pages to follow]

THE UNDERSIGNED REPRESENTATIVE OF THE GRANTOR REPRESENTS AND CERTIFIES THAT HE/SHE IS AUTHORIZED TO EXECUTE THIS ENVIRONMENTAL COVENANT.

IN WITNESS WHEREOF, THIS INSTRUMENT HAS BEEN EXECUTED ON THE DATES INDICATED BELOW:

FOR THE GRANTOR:

STANDARD BANK & TRUST CO., AS TRUSTEE
UNDER ILLINOIS LAND TRUST NO. 21032,
DATED MAY 18, 2011

By Margaret Maldonado (signature)

Name: Margaret Maldonado
Primary Beneficiary of the Standard Bank & Trust Co.,
as Trustee under Illinois Land Trust No. 21032, dated May 18, 2011

State of Illinois)
) SS.
County of Cook)

On April 28th, 2014, this instrument was acknowledged before me by MARGARET MALDONADO, _____, Primary Beneficiary of the Standard Bank & Trust Co., as Trustee under Illinois Land Trust No. 21032, dated May 18, 2011.

_____(signature)
Notary Public
My Commissioner Expires:

EVONDA LOVE
OFFICIAL SEAL
Notary Public - State of Illinois
My Commission Expires
June 27, 2017

FOR THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

On behalf of the Administrator of the
United States Environmental Protection Agency

By: _____
Richard C. Karl, Director
Superfund Division
U.S. Environmental Protection Agency, Region 5

STATE OF ILLINOIS)
) SS.
COUNTY OF COOK)

The foregoing instrument was acknowledged before me this 8th day of July, 2014, by Richard C. Karl, Director, Superfund Division, Region 5 of the United States Environmental Protection Agency.

_____ (signature)
Notary Public
My Commission Expires: March 24, 2018

OFFICIAL SEAL
BERTANNA M LOUIE
NOTARY PUBLIC - STATE OF ILLINOIS
MY COMMISSION EXPIRES:03/24/18

FOR THE ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

By Lisa Bonnett (signature)

LISA BONNETT, Director
Illinois Environmental Protection Agency

State of Illinois)
)SS.
County of Sangamon)

The foregoing instrument was acknowledged before me on June 13, 2014, by LISA BONNETT, the Director of the Illinois Environmental Protection Agency, a state agency, on behalf of the State of Illinois.

Sherrie A. Elzinga (signature)
Notary Public
My Commission Expires 12/23/2015

OFFICIAL SEAL
SHERRIE A. ELZINGA
NOTARY PUBLIC, STATE OF ILLINOIS
MY COMMISSION EXPIRES 12-23-2015

LIST OF EXHIBITS

- Exhibit A — Legal Description of the Property
- Exhibit B — Consent Order
- Exhibit C — USEPA Approved Work Plan
- Exhibit D — Completion Letter
- Exhibit E — Map of Uninvestigated Site Area
- Exhibit F— Title Policy

EXHIBIT A
Legal Description of Property

PARCEL 1:

LOT 4 IN ASSESSOR'S DIVISION OF THE SOUTH ½ OF THE EAST 100 FEET OF THE NORTH ½ BLOCK 21 IN KINZIE'S ADDITION TO CHICAGO, BEING A SUBDIVISION OF THE NORTH FRACTIONAL ½ OF SECTION 10, TOWNSHIP 39 NORTH, RANGE 14, EAST OF THE THIRD PRINCIPAL MERIDIAN, IN COOK COUNTY, ILLINOIS.

PARCEL 2:

LOT 3 IN ASSESSOR'S DIVISION OF THE SOUTH ½ OF THE EAST 100 FEET OF THE NORTH ½ OF BLOCK 21 IN KINZIE'S ADDITION TO CHICAGO, BEING A SUBDIVISION OF THE NORTH FRACTIONAL ½ OF SECTION 10, TOWNSHIP 39 NORTH, RANGE 14, EAST OF THE THIRD PRINCIPAL MERIDIAN, IN COOK COUNTY, ILLINOIS.

17-10-122-016
17-10-122-017

EXHIBIT B
Consent Order

COOK COUNTY
RECORDER OF DEEDS
SCANNED BY_____

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5

IN THE MATTER OF:

Lindsay Light II Operable Unit 20
164 East Grand Avenue
Chicago, Illinois

Respondent:

Standard Bank & Trust Co., as Trustee under Illinois Land Trust No. 21032, dated May 18, 2011

ADMINISTRATIVE SETTLEMENT AGREEMENT AND ORDER ON CONSENT FOR REMOVAL ACTION

Docket No. V-W-13-C-002

Proceeding Under Sections 104, 106(a), 107 and 122 of the Comprehensive Environmental Response, Compensation, and Liability Act, as amended, 42 U.S.C. §§ 9604, 9606(a), 9607 and 9622

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Lindsay Light II, OU 20
164 East Grand Avenue
Illinois Land Trust No. 21032
Chicago, Illinois

I. JURISDICTION AND GENERAL PROVISIONS

1. This Administrative Settlement Agreement and Order on Consent (Settlement Agreement) is entered into voluntarily by the United States Environmental Protection Agency (U.S. EPA) and Respondent. This Settlement Agreement provides for the performance of removal actions by Respondent and the payment of certain response costs incurred by the United States at or in connection with the property designated Lindsay Light Operable Unit (OU 20) located at 164 East Grand Avenue in Chicago, Cook County, Illinois, the "Site."

2. This Settlement Agreement is issued under the authority vested in the President of the United States by Sections 104, 106(a), 107 and 122 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. §§ 9604, 9606(a), 9607 and 9622. This authority has been delegated to the Administrator of the U.S. EPA by Executive Order No. 12580, January 23, 1987, 52 Federal Register 2923, and further delegated to the Regional Administrators by the U.S. EPA Delegation Nos. 14-14-A, 14-14-C and 14-14-D, and to the Director, Superfund Division, Region 5, by Regional Delegation Nos. 14-14-A, 14-14-C and 14-14-D.

3. The U.S. EPA has notified the State of Illinois (the State) of this action pursuant to Section 106(a) of CERCLA, 42 U.S.C. § 9606(a).

4. The U.S. EPA and Respondent recognize that this Settlement Agreement has been negotiated in good faith and that the actions undertaken by Respondent in accordance with this Settlement Agreement do not constitute an admission of any liability. Respondent does not admit, and retains the right to controvert in any subsequent proceedings other than proceedings to implement or enforce this Settlement Agreement, the validity of the findings of facts, conclusions of law, and determinations in Sections IV (Findings Of Fact) and V (Conclusions Of Law And Determinations) of this Settlement Agreement. Respondent agrees to comply with and be bound by the terms of this Settlement Agreement and further agrees that it will not contest the basis or validity of this Settlement Agreement or its terms.

II. PARTIES BOUND

5. This Settlement Agreement applies to and is binding upon the U.S. EPA and upon Respondent and its beneficiaries, successors and assigns. Any change in ownership or corporate status of a Respondent including, but not limited to, any transfer of assets or real or personal property shall not alter such Respondent's responsibilities under this Settlement Agreement.

6. Respondent is jointly and severally liable for carrying out all activities required by this Settlement Agreement.

7. Respondent shall ensure that its contractors, subcontractors, and representatives comply with this Settlement Agreement. Respondent shall be responsible for any noncompliance with this Settlement Agreement.

III. DEFINITIONS

8. Unless otherwise expressly provided in this Settlement Agreement, terms used in this Settlement Agreement that are defined in CERCLA or in regulations promulgated under CERCLA shall have the meaning assigned to them in CERCLA or in such regulations. Whenever terms listed below are used in this Settlement Agreement or in the appendices attached hereto and incorporated hereunder, the following definitions shall apply:

a. "CERCLA" shall mean the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. §§ 9601-9675.

b. "Day" shall mean a calendar day unless otherwise specified. In computing any period of time under this Settlement Agreement, where the last day would fall on a Saturday, Sunday, or Federal holiday, the period shall run until the close of business of the next working day.

c. "Effective Date" shall be the effective date of this Settlement Agreement as provided in Section XXXI (Effective Date).

d. "Interest" shall mean interest at the rate specified for interest on investments of the U.S. EPA Hazardous Substance Superfund established by 26 U.S.C. § 9507, compounded annually on October 1 of each year, in accordance with 42 U.S.C. § 9607(a). The applicable rate of interest shall be the rate in effect at the time the interest accrues. The rate of interest is subject to change on October 1 of each year.

e. "National Contingency Plan" or "NCP" shall mean the National Oil and Hazardous Substances Pollution Contingency Plan promulgated pursuant to Section 105 of CERCLA, 42 U.S.C. § 9605, codified at 40 C.F.R. Part 300, and any amendments thereto.

f. "Paragraph" shall mean a portion of this Settlement Agreement identified by an Arabic numeral or an upper or lower case letter.

g. "Parties" shall mean the U.S. EPA and Respondent.

h. "Response Costs" shall mean all costs, including, but not limited to, direct and indirect costs, that the United States has incurred or incurs in reviewing or developing plans, reports and other items pursuant to this Settlement Agreement, in overseeing implementation of the Work, or otherwise implementing, overseeing, or enforcing this Settlement Agreement on or after the

Effective Date. Response Costs shall also include, but not be limited to, payroll costs, contractor costs, travel costs, laboratory costs, the costs incurred pursuant to Paragraph 24 (including, but not limited to, costs and attorneys fees and any monies paid to secure access, including, but not limited to, the amount of just compensation), and Paragraph 37 (emergency response). Response Costs shall also include all costs, including, but not limited to, direct and indirect costs, incurred prior to the Effective Date, but paid after that date.

i. "RCRA" shall mean the Solid Waste Disposal Act, as amended, 42 U.S.C. §§ 6901, *et seq.* (also known as the Resource Conservation and Recovery Act).

j. "Respondent" shall mean Standard Bank & Trust Co., as Trustee under Illinois Land Trust No. 21032, dated May 18, 2011.

k. "Section" shall mean a portion of this Settlement Agreement identified by a Roman numeral.

l. "Settlement Agreement" shall mean this Administrative Settlement Agreement and Order on Consent and any appendices attached hereto (listed in Section XXX (Severability/Integration/Attachment). In the event of conflict between this Settlement Agreement and any appendix, this Settlement Agreement shall control.

m. "Site" shall mean the Lindsay Light II, Operable Unit 20, located at 164-166 East Grand Avenue in Chicago, Illinois and is comprised of two parcels which front the north side of East Grand Avenue and the west side of North St. Clair Street. The parcel property identification numbers are 17-10-122-016 and 17-10-122-017 and depicted generally on the map attached as Attachment A.

n. "State" shall mean the State of Illinois.

o. "United States" shall mean the United States of America and each department, agency, and instrumentality of the United States, including the U.S. EPA.

p. The "U.S. EPA" shall mean the United States Environmental Protection Agency and any successor departments or agencies of the United States.

q. "Waste Material" shall mean 1) any "hazardous substance" under Section 101(14) of CERCLA, 42 U.S.C. § 9601(14); 2) any pollutant or contaminant under Section 101(33) of CERCLA, 42 U.S.C. § 9601(33); 3) any "solid waste" under Section 1004(27) of RCRA, 42 U.S.C. § 6903(27); and 4) any "hazardous material" under Section 3.125 of the Illinois Environmental Protection Act, 415 ILCS 5/3.125 (2002).

r. "Work" shall mean all activities Respondent is required to perform under this Settlement Agreement, except those required by Section XII (Record Retention).

s. "Work Plan" shall mean the U.S. EPA-approved work plan including the schedule described in Section VIII Work to be Performed.

IV. FINDINGS OF FACT

9. Based on available information, including the Administrative Record in this matter, the U.S. EPA hereby finds that:

a. The Site is located at 164-166 East Grand Avenue in Chicago, Illinois and is comprised of two parcels which front the north side of East Grand Avenue and the west side of North St. Clair Street. The parcel property identification numbers are 17-10-122-016 and 17-10-122-017.

b. The Site is situated directly across from the former Lindsay Light Company (Lindsay Light) building located at 161 East Grand Avenue in Chicago, Illinois where Lindsay manufactured residential and commercial gas light mantles that contained radioactive thorium. The Site is also located south and west of 316 East Illinois Street, where Lindsay Light refined monazite ore to produce thorium nitrate and manufacture thorium-impregnated gas mantles.

c. Beginning in 1904, Lindsay Light refined monazite ore to produce thorium nitrate and manufactured gas lights and gas mantles for residential and commercial use at several locations in the Streeterville area of Chicago. Lindsay Light's thorium refining process resulted in a waste known as mill tailings which was apparently used as fill material or otherwise came to be located in the Streeterville area.

d. The Lindsay Light mill tailings contain thorium-232 which is a radionuclide that is a hazardous substance under Section 101(14) of CERCLA, 42 U.S.C. § 9601(14).

e. U.S. EPA designated the thorium removal action at 316 East Illinois Street, the former location of a Lindsay Light ore processing plant, as the Lindsay Light II Removal Site. Following that initial removal action, during which approximately 24,000 cubic yards of thorium contaminated soils were removed, U.S. EPA has identified 18 other removal action operable units associated with the Lindsay Light II facility and, to date, more than 50,000 cubic yards of thorium-contaminated material associated with the Lindsay Light II facility have been removed from the Streeterville area.

f. The Site property is comprised of a one-story 2,500 square foot building constructed in the early 1940s and an adjacent parking lot. Both parcels were recently purchased by an Illinois Land Trust in a sealed bid auction.

g. The current owner, Standard Bank & Trust Co., as Trustee under Illinois Land Trust Number 21032, dated May 18, 2011, is actively in the process of renovating the on-site building into a two-story restaurant. On October 5, 2012, elevated gamma readings were detected in soils during excavation beneath the lower level slab along the length of the west foundation wall. The excavated soil is currently stockpiled inside the building along the foundation wall.

h. Subsurface thorium contamination has been identified at the Site. The highest sample result indicates 71.75 picoCuries per gram (pCi/g) total radium, which exceeds the 7.1 pCi/g cleanup criterion for the Streeterville area of Chicago.

i. Construction laborers, utility workers and the public may be exposed to elevated levels of thorium if the Site is excavated without proper radiation monitoring, and management and disposal of radioactively contaminated materials.

j. Respondent may identify and remove radioactively contaminated soil only from certain portions of the Site.

V. CONCLUSIONS OF LAW AND DETERMINATIONS

10. Based on the Findings of Fact set forth above, and the Administrative Record supporting this removal action, the U.S. EPA has determined that:

a. The Site is a "facility" as defined by Section 101(9) of CERCLA, 42 U.S.C. § 9601(9).

b. The contamination found at the Site, as identified in the Findings of Fact above, includes "hazardous substance(s)" as defined by Section 101(14) of CERCLA, 42 U.S.C. § 9601(14).

c. The Respondent is a "person" as defined by Section 101(21) of CERCLA, 42 U.S.C. § 9601(21).

d. The Respondent is a responsible party under Section 107(a) of CERCLA, 42 U.S.C. § 9607(a), and is jointly and severally liable for performance of response actions and for response costs incurred and to be incurred at the Site.

i. Respondent is the "owner" and/or "operator" of the facility, as defined by Section 101(20) of CERCLA, 42 U.S.C. § 9601(20), and within the meaning of Section 107(a)(1) of CERCLA, 42 U.S.C. § 9607(a)(1).

e. The conditions described in the Findings of Fact above constitute an actual or threatened "release" of a hazardous substance from the facility into the "environment" as defined by Sections 101(22) and 101(8) of CERCLA, 42 U.S.C.§§ 9601(22) and 9601(8).

f. The conditions present at the Site constitute a threat to public health, welfare, or the environment based upon the factors set forth in Section 300.415(b)(2) of the National Oil and Hazardous Substances Pollution Contingency Plan, as amended (NCP), 40 CFR § 300.415(b)(2). These factors include, but are not limited to, the following:

i. Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances, pollutants or contaminants; this factor is present at the Site due to the existence of elevated levels of thorium found in subsurface soils that will be exposed by the removal of asphalt, concrete, soils and excavation.

ii. High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface, that may migrate; this factor is present at the Site due to the existence of elevated levels of thorium in subsurface soils that will be exposed by the removal of asphalt, concrete, soils and excavation.

iii. Other situations or factors that may pose threats to public health or welfare or the environment; this factor is present at the Site due to the existence of elevated levels of thorium in subsurface soils that may be exposed or unearthed during construction activities that may expose construction laborers, utility workers and the public to excessive levels of thorium.

g. The removal actions required by this Settlement Agreement, including environmental covenants and/or institutional controls, are necessary to protect the public health, welfare, or the environment and, if carried out in compliance with the terms of this Settlement Agreement, will be consistent with the NCP, as provided in Section 300.700(c)(3)(ii) of the NCP.

VI. SETTLEMENT AGREEMENT AND ORDER

11. Based upon the foregoing Findings of Fact, Conclusions of Law, Determinations, and the Administrative Record for this Site, it is hereby Ordered and Agreed that Respondent shall comply with all provisions of this Settlement Agreement, including, but not limited to, all attachments to this Settlement Agreement and all documents incorporated by reference into this Settlement Agreement.

VII. DESIGNATION OF CONTRACTOR, PROJECT COORDINATOR, AND ON-SCENE COORDINATOR

12. Respondent has selected a supervising contractor known as AECOM to perform the Work and has provided U.S. EPA with the qualifications of AECOM. Respondent has also notified the U.S. EPA of Stan Huber Consultants as subcontractor retained to perform the Work at the Site and has provided U.S. EPA with the qualifications of Stan Huber Consultants. If Respondent retains a different or additional contractor or subcontractor to perform the Work, Respondent shall notify U.S. EPA 5 business days prior to commencement of such Work. The U.S. EPA retains the right to disapprove of any or all of the contractors and/or subcontractors retained by Respondent. If the U.S. EPA disapproves of a selected contractor, Respondent shall retain a different contractor and shall notify the U.S. EPA of that contractor's name and qualifications within 3 business days of the U.S. EPA's disapproval. The contractor must demonstrate compliance with American National Standards Institute/American Society for Quality Control (ANSI/ASQC) E-4-2004, "Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs" (American National Standard, January 5, 1995), by submitting a copy of the proposed contractor's Quality Management Plan (QMP). The QMP should be prepared consistent with "EPA Requirements for Quality Management Plans (QA/R-2)" (EPA/240/B-01/002) March 2001, Reissue Notice May 2006, or equivalent documentation as required by the U.S. EPA. Any decision not to require submission of the contractor's QMP should be documented in a memorandum from the On-Scene Coordinator (OSC) and Regional quality assurance personnel to the Site file.

13. Respondent has designated, and the U.S. EPA has not disapproved, Dr. Steve Kornder of AECOM as Project Coordinator, who shall be responsible for administration of all actions by Respondent required by this Settlement Agreement. To the greatest extent possible, the Project Coordinator shall be present on Site or readily available during Site work. The U.S. EPA retains the right to disapprove of a designated Project Coordinator. If the U.S. EPA disapproves of a designated Project Coordinator, Respondent shall retain a different Project Coordinator and shall notify the U.S. EPA of that person's name, address, telephone number, and qualifications within 4 business days following the U.S. EPA's disapproval. Receipt by Respondent's Project Coordinator of any notice or communication from the U.S. EPA relating to this Settlement Agreement shall constitute receipt by Respondent.

14. The U.S. EPA has designated Verneta Simon of the Emergency Response Branch, Region 5, as its On-Scene Coordinator (OSC) and Gene Jablonowski, Health Physicist, of the Remedial Response Branch, Region 5 as its alternate OSC. Except as otherwise provided in this Settlement Agreement, Respondent shall direct all submissions required by this Settlement Agreement to the OSCs in accordance with Section XXIX Notices and Submissions. Respondent is encouraged to make its submissions to the U.S. EPA electronically or on recycled

paper (which includes significant post consumer waste paper content where possible) and using two-sided copies.

15. The U.S. EPA and Respondent shall have the right, subject to Paragraph 13, to change its respective designated OSC or Project Coordinator. The U.S. EPA shall notify the Respondent, and Respondent shall notify the U.S. EPA, as early as possible before such a change is made, but in no case less than 24 hours before such a change. The initial notification may be made orally but shall be promptly followed by a written notice.

VIII. WORK TO BE PERFORMED

16. Respondent shall perform, at a minimum, the following removal activities:

a. Develop a Work Plan for the radiological assessment of the Site.

b. Develop and implement a Site health and safety plan.

c. Develop and implement an air monitoring plan.

d. Develop and implement Site security measures.

e. Conduct land surveying to the extent necessary locate all property boundaries, special features (pipes, storage tanks, etc.), and any sample locations.

f. Conduct radiation surveillance and sampling in compliance with the U.S. EPA approved work plan.

g. Collect soil samples and analyze for radionuclide content and RCRA characteristics. These results will then be used by the Respondent to correlate subsurface radiation levels and radionuclide content, and to determine the disposal facility.

h. Conduct off-site radiological surveying and sampling as necessary should contamination be discovered within the rights-of-ways surrounding the Site and, at a minimum implement 40 C.F.R. § 192 if deemed necessary.

i. Based upon soil results, remove, transport and dispose of all characterized or identified hazardous substances, pollutants, wastes or contaminants at a RCRA/CERCLA approved disposal facility in accordance with the U.S. EPA off-site rule.

j. The soil clean-up criterion is 7.1 picoCuries per gram (pCi/g) total radium (Ra-226 + Ra-228) including background, unless analyses indicate the existence of additional contaminants, hazardous substances, pollutants or waste.

k. If any portion of the Site is not radiologically surveyed in 18-inch lifts or if any known contamination will remain after completion of the Work then, using a scaled Site map with survey grade coordinates and elevations, Respondent shall identify and denote all locations that were not radiologically surveyed in 18-inch lifts or where any known contamination will remain after completion of the Work and shall implement the U.S. EPA-approved Environmental Covenant or other U.S. EPA-approved institutional control pertaining to the Site.

l. Record a U.S. EPA-approved Environmental Covenant which runs with the land and that will require radiation monitoring whenever subsurface soils at the Site are exposed or excavated, as well as proper management and disposal of any radioactively contaminated material encountered.

17. Work Plan and Implementation.

a. Within 10 business days after the Effective Date, Respondent shall submit to the U.S. EPA for approval a draft Work Plan for performing the removal action generally described in Paragraph 16 above. The draft Work Plan shall provide a description of, and an expeditious schedule for, the actions required by this Settlement Agreement. The Work Plan shall include a Quality Assurance Project Plan (QAPP). The Respondent shall prepare a QAPP as part of the Work Plan except in circumstances involving emergency or non-complex removal work. The QAPP should be prepared in accordance with "EPA Requirements for Quality Assurance Project Plans (QA/R-5)" (EPA/240/B-01/003, March 2001), and "EPA Guidance for Quality Assurance Project Plans (QA/G-5)" (EPA/600/R-98/018, February, 1998).

The following documents shall be used for the development of QAPPs for Region 5 Superfund sites:

- The Uniform Federal Policy for Quality Assurance Projects Plans (UFP-QAPP), OSWER Directive 9272.0-17;
- EPA Requirements for Quality Assurance Project Plans QA/R-5 (EPA/240/B-01/003), March 2001, Reissued May 2006.

The following guidance may be used in conjunction with the requirements above:

- EPA Guidance for Quality Assurance Project Plans QA/G-5 (EPA/240/R-02/009), December 2002.
- Guidance on Choosing a Sampling Design for Environmental Data Collection EPA

QA/G-5S, December 2002.

b. The U.S. EPA may approve, disapprove, require revisions to, or modify the draft Work Plan in whole or in part. If the U.S. EPA requires revisions, Respondent shall submit a revised draft Work Plan within 7 business days of receipt of the U.S. EPA's notification of the required revisions. Respondent shall implement the Work Plan as approved in writing by U.S. EPA in accordance with the schedule approved by the U.S. EPA. Once approved, or approved with modifications, the Work Plan, the schedule, and any subsequent modifications shall be incorporated into and become fully enforceable under this Settlement Agreement.

c. Respondent shall not commence any Work except in conformance with the terms of this Settlement Agreement. Respondent shall not commence implementation of the Work Plan developed hereunder until receiving written U.S. EPA approval pursuant to Paragraph 17(b).

18. Health and Safety Plan. Within 10 business days after the Effective Date, Respondent shall submit for the U.S. EPA review and comment a plan that ensures the protection of the public health and safety during performance of on-site work under this Settlement Agreement. This plan shall be prepared consistent with the U.S. EPA's Standard Operating Safety Guide (PUB 9285.1-03, PB 92-963414, June 1992). In addition, the plan shall comply with all currently applicable Occupational Safety and Health Administration (OSHA) regulations found at 29 C.F.R. Part 1910. If the U.S. EPA determines that it is appropriate, the plan shall also include contingency planning. Respondent shall incorporate all changes to the plan recommended by the U.S. EPA and shall implement the plan during the pendency of the removal action.

19. Quality Assurance and Sampling.

a. All sampling and analyses performed pursuant to this Settlement Agreement shall conform to the U.S. EPA direction, approval, and guidance regarding sampling, quality assurance/quality control (QA/QC), data validation, and chain of custody procedures. Respondent shall ensure that the laboratory used to perform the analyses participates in a QA/QC program that complies with the appropriate U.S. EPA guidance. Respondent shall follow, as appropriate, "Quality Assurance/Quality Control Guidance for Removal Activities: Sampling QA/QC Plan and Data Validation Procedures" (OSWER Directive No. 9360.4-01, April 1, 1990), as guidance for QA/QC and sampling. Respondent shall only use laboratories that have a documented Quality System that complies with ANSI/ASQC E-4 1994, "Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs" (American National Standard, January 5, 1995), and EPA Requirements for Quality Management Plans (QA/R-2) (EPA/240/B-01/002, March 2001, Reissued May 2006)," or equivalent documentation as determined by the U.S. EPA. The U.S. EPA may consider laboratories accredited under the National Environmental Laboratory Accreditation Program (NELAP) as meeting the Quality System requirements.

b. Upon request by the U.S. EPA, Respondent shall have such a laboratory analyze samples submitted by the U.S. EPA for QA monitoring. Respondent shall provide to the U.S. EPA the QA/QC procedures followed by all sampling teams and laboratories performing data collection and/or analysis.

c. Upon request by the U.S. EPA, Respondent shall allow the U.S. EPA or its authorized representatives to take split and/or duplicate samples. Respondent shall notify the U.S. EPA not less than 3 business days in advance of any sample collection activity, unless shorter notice is agreed to by the U.S. EPA. The U.S. EPA shall have the right to take any additional samples that U.S. EPA deems necessary. Upon request, the U.S. EPA shall allow Respondent to take split or duplicate samples of any samples it takes as part of its oversight of Respondent's implementation of the Work.

20. Reporting.

a. Respondent shall submit a written progress report to the U.S. EPA concerning actions undertaken pursuant to this Settlement Agreement every 30th day after the date of receipt of the U.S. EPA's approval of the Work Plan until termination of this Settlement Agreement, unless otherwise directed in writing by the OSC. These reports shall describe all significant developments during the preceding period, including the actions performed and any problems encountered, analytical data received during the reporting period, and the developments anticipated during the next reporting period, including a schedule of actions to be performed, anticipated problems, and planned resolutions of past or anticipated problems.

b. Respondent shall submit 3 copies of all plans, reports or other submissions required by this Settlement Agreement, or any approved work plan. Upon request by the U.S. EPA, Respondent shall submit such documents in electronic form.

c. Respondent who owns or controls property at the Site shall, at least 30 days prior to the conveyance of any interest in real property at the Site, give written notice to the transferee that the property is subject to this Settlement Agreement and written notice to the U.S. EPA and Illinois, including the name and address of the transferee. Respondent who owns or controls property at the Site also agrees to require that its successors comply with the immediately proceeding sentence and Sections IX (Site Access) and XI (Access to Information).

21. Final Report. Within 60 days after completion of all Work required by Section VIII. (Work To Be Performed) of this Settlement Agreement, Respondent shall submit for the U.S. EPA review and approval a final report summarizing the actions taken to comply with this Settlement Agreement. The final report shall conform, at a minimum, with the requirements set forth in Section 300.165 of the NCP entitled "OSC Reports" and with the guidance set forth in "Superfund Removal Procedures: Removal Response Reporting – POLREPS and OSC Reports"

(OSWER Directive No. 9360.3-03, June 1, 1994). The final report shall include a good faith estimate of total costs or a statement of actual costs incurred in complying with the Settlement Agreement, a listing of quantities and types of materials removed off-site or handled on-site, a discussion of removal and disposal options considered for those materials, a listing of the ultimate destination(s) of those materials, a presentation of the analytical results of all sampling and analyses performed, and accompanying appendices containing all relevant documentation generated during the removal action (*e.g.*, manifests, invoices, bills, contracts, and permits). The final report shall also include the following certification signed by a person who supervised or directed the preparation of that report:

> "Under penalty of law, I certify that to the best of my knowledge, after appropriate inquiries of all relevant persons involved in the preparation of the report, the information submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

22. Off-Site Shipments.

a. Radioactive Waste Material. Respondent will transport radioactive waste material to a disposal facility permitted to accept radioactive Waste Material from the Site. Prior to the initial shipment of radioactive Waste Material originating from the Site, Respondent shall provide written notification of such shipment to the appropriate state environmental official and to the On-Scene Coordinators. However, this notification requirement shall not apply to any off-site shipments when the total volume of all such shipments will not exceed 10 cubic yards.

i. Respondent shall include in the written notification the following information: 1) the name and location of the facility to which the Waste Material is to be shipped; 2) the type and quantity of the Waste Material to be shipped; 3) the expected schedule for the shipment of the Waste Material; and 4) the method of transportation. Respondent shall notify the state in which the planned receiving facility is located of major changes in the shipment plan, such as a decision to ship the Waste Material to another facility within the same state, or to a facility in another state.

ii. The identity of the receiving facility and state will be determined by Respondent following the award of the contract for the disposal of Waste Material from the Site. Respondent shall provide the information required by Paragraph 22(a) as soon as practicable after the award of the contract and before the Waste Material is actually shipped.

b. Other Waste Material. If Respondent encounters any hazardous substances that are not radioactively contaminated in the course of conducting the Work, then before shipping any such non-radioactively contaminated hazardous substances, pollutants, or contaminants from the Site to an off-site location, Respondent shall obtain the U.S. EPA's certification that the proposed receiving facility is operating in compliance with the requirements of CERCLA Section 121(d)(3), 42 U.S.C. § 9621(d)(3), and 40 C.F.R. § 300.440. Respondent shall only send hazardous substances, pollutants, or contaminants from the Site to an off-site facility that complies with the requirements of the statutory provision and regulation cited in the preceding sentence.

i. Prior to the initial shipment of non-radioactively contaminated Waste Material originating from the Site, Respondent shall provide written notification of such shipment to the appropriate state environmental official and to the On-Scene Coordinators. However, this notification requirement shall not apply to any off-site shipments when the total volume of all such shipments will not exceed 10 cubic yards. Settling Defendant shall comply with the terms and conditions of the notification requirements of Paragraph 22.a. i. for each such shipment of non-radioactive hazardous substances, pollutants, and contaminants.

ii. The identity of any facility and state receiving the non-radioactively contaminated Waste Material will be determined by Respondent following the award of the contract for the removal action. Respondent shall provide the information required by Paragraph 22(b) as soon as practicable after the award of the contract and before the Waste Material is actually shipped.

IX. SITE ACCESS

23. If the Site, or any other property where access is needed to implement this Settlement Agreement, is owned or controlled by Respondent, Respondent shall, commencing on the Effective Date, provide the U.S. EPA, the State, and its representatives, including contractors, with access at all reasonable times to the Site, or such other property, for the purpose of conducting any activity related to this Settlement Agreement.

24. Where any action under this Settlement Agreement is to be performed in areas owned by or in possession of someone other than Respondent, Respondent shall use its best efforts to obtain all necessary access agreements within 10 business days after the Effective Date, or as otherwise specified in writing by the OSC. Respondent shall immediately notify the U.S. EPA if after using its best efforts that it is unable to obtain such agreements. For purposes of this Paragraph, "best efforts" includes the payment of reasonable sums of money in consideration of access. Respondent shall describe in writing its efforts to obtain access. The U.S. EPA may then

assist Respondent in gaining access, to the extent necessary to effectuate the response actions described in this Settlement Agreement, using such means as the U.S. EPA deems appropriate. Respondent shall reimburse the U.S. EPA for all costs and attorney's fees incurred by the United States in obtaining such access, in accordance with the procedures in Section XVI (Payment of Response Costs).

25. Notwithstanding any provision of this Settlement Agreement, the U.S. EPA and the State retain all of their access authorities and rights, including enforcement authorities related thereto, under CERCLA, RCRA, and any other applicable statutes or regulations.

X. ENVIRONMENTAL COVENANT/ INSTITUTIONAL CONTROL DOCUMENT

26. Post-Removal Site Control. Consistent with Section 300.415(l) of the NCP and OSWER Directive No. 9360.2-02, upon completion of all Work required by Section VIII of this Settlement Agreement, if any portion of the Site is not radiologically surveyed in 18-inch lifts to native sand in accordance with the approved Work Plan or if any known contamination will remain after completion of the Work then:

a. In accordance with the Work Plan, Respondent shall submit to the U.S. EPA a scaled Site map of the Uninvestigated Site Area with survey grade coordinates and elevations, showing the location of any actual thorium-contaminated Waste Material or areas of the Site that have not been screened in 18-inch lifts to native sand; and

b. If Respondent, its contractors, representatives or agents disturb, expose or intrude upon the soils in the Uninvestigated Site Area, Respondent, its contractors, representatives and agents shall notify the U.S. EPA, both by telephone and in writing, of plans to work in the Uninvestigated Site Area. Respondent shall notify the U.S. EPA at least 72 hours prior to (but no more than 21 calendar days in advance of) commencing such activities. If material exceeding 7.1 pCi/g (total radium (Ra-226 +Ra-228) is identified, the Respondent shall provide a letter report to the U.S. EPA explaining how the work was conducted in accordance with the Work Plan within 60 days of completion of the work.

27. Within thirty (30) days of the completion of all Work required by Section VIII of the Settlement Agreement, if any portion of the Site is not radiologically surveyed in 18-inch lifts to native sand in accordance with the Work Plan or if any known contamination will remain after completion of the Work, Respondent shall record, with the Recorder of Deeds, Cook County, Illinois, an Environmental Covenant, pursuant to the Uniform Environmental Covenants Act, 765 ILCS Ch. 22 (UECA) (Environmental Covenant), that the U.S. EPA and Illinois EPA have approved in writing for this Site, and Respondent agrees that every subsequent deed or conveyance or transfer of any property interest instrument will be subject to the Environmental Covenant. The Respondent further agrees, as described in Paragraph 28, that the U.S. EPA and

Illinois EPA must pre-approve any modification (including any deletion) of that language in the Environmental Covenant.

a. In the event of a conveyance or transfer of property interest, Respondent's obligations under this Settlement Agreement, including, but not limited to, its obligation to provide or secure access and institutional controls, as well as to abide by such institutional controls pursuant to this Section (Environmental Covenants/Institutional Control Document), shall continue to be met by Respondent unless otherwise agreed to by the U.S. EPA and Illinois EPA in writing. In no event shall the conveyance or transfer of property interest release or otherwise affect the liability of Respondent to comply with all provisions of this Settlement Agreement unless otherwise agreed to among the Parties hereto in writing.

b. The intent of Respondent is to record an Environmental Covenant that is applicable to each subsequent owner of the Site. The Environmental Covenant will apply to any portion of the Site that is not radiologically surveyed in 18-inch lifts or where any known contamination will remain after completion of the Work. The Environmental Covenant shall provide the following:

1) subject to Paragraph 28, a restriction that "runs with the land" regulating the disturbance of, exposure of or intrusion upon any portion of the Uninvestigated Site Area;

2) the right to enforce said restrictions;

3) a right of access to the Site;

4) prior notice of disturbance, exposure, intrusion, or excavation of the soils in any portion of the Site that is not radiologically surveyed in 18-inch lifts or where any known contamination will remain; and

5) an agreement that when soils are disturbed, exposed, intruded or excavated in those areas, those activities are conducted in accordance with the Work Plan.

c. The Respondent agrees that every subsequent deed or other instrument conveying or transferring a property interest in the real estate underlying the Site or any portion thereof shall be subject to the Environmental Covenant.

28. The U.S. EPA and Illinois EPA may terminate the restrictions in Paragraphs 26 and 27, in whole or in part, in writing, as authorized by law. If requested by the U.S. EPA and Illinois EPA, such writing will be executed by the Respondent in recordable form and recorded with the Recorder of Deeds, Cook County, Illinois. Respondent may modify or terminate the

above restrictions in whole or in part, in writing, with the prior written approval of the U.S. EPA and Illinois EPA. Respondent may seek to modify or terminate, in whole or in part, the restrictions by submitting to the U.S. EPA and Illinois EPA, for approval, a written application that identifies each such restriction to be terminated or modified, describes the terms of each proposed modification and includes proposed revision(s) to the Environmental Covenant and institutional control document described in this Section X (Environmental Covenant/Institutional Control Document). Each application for termination or modification of any restriction shall include a demonstration that the requested termination or modification will not interfere with, impair or reduce protection of human health and the environment. If the U.S. EPA together with Illinois EPA makes a determination that an application satisfies the requirements of this Paragraph, including the criteria specified above, the U.S. EPA will notify Respondent in writing. If the U.S. EPA does not respond in writing to a request to change land use within 90 days of its receipt of that request, unless Respondent agrees to extend this period beyond 90 days, the U.S. EPA and Illinois EPA may be deemed to have denied the request. If a modification to or termination of restriction is approved, Respondent shall record the revised Environmental Covenant as approved by the U.S. EPA and Illinois EPA, with the Recorder of Deeds, Cook County, Illinois.

XI. ACCESS TO INFORMATION

29. Respondent shall provide to the U.S. EPA, upon request, copies of all documents and information within its possession or control or that of its contractors or agents relating to activities at the Site or to the implementation of this Settlement Agreement, including, but not limited to, sampling, analysis, chain of custody records, manifests, trucking logs, receipts, reports, sample traffic routing, correspondence, or other documents or information related to the Work. Respondent shall also make available to the U.S. EPA, for purposes of investigation, information gathering, or testimony, its employees, agents, or representatives with knowledge of relevant facts concerning the performance of the Work.

30. Respondent may assert business confidentiality claims covering part or all of the documents or information submitted to the U.S. EPA under this Settlement Agreement to the extent permitted by and in accordance with Section 104(e)(7) of CERCLA, 42 U.S.C. § 9604(e)(7), and 40 C.F.R. § 2.203(b). Documents or information determined to be confidential by the U.S. EPA will be afforded the protection specified in 40 C.F.R. Part 2, Subpart B. If no claim of confidentiality accompanies documents or information when they are submitted to the U.S. EPA, or if the U.S. EPA has notified Respondent that the documents or information are not confidential under the standards of Section 104(e)(7) of CERCLA or 40 C.F.R. Part 2, Subpart B, the public may be given access to such documents or information without further notice to Respondent.

31. Respondent may assert that certain documents, records and other information are privileged under the attorney-client privilege or any other privilege recognized by federal law. If the Respondent assert such a privilege in lieu of providing documents, it shall provide the U.S. EPA with the following: 1) the title of the document, record, or information; 2) the date of the document, record, or information; 3) the name and title of the author of the document, record, or information; 4) the name and title of each addressee and recipient; 5) a description of the contents of the document, record, or information; and 6) the privilege asserted by Respondent. However, no documents, reports or other information created or generated pursuant to the requirements of this Settlement Agreement shall be withheld on the grounds that they are privileged or confidential.

32. No claim of privilege or confidentiality shall be made with respect to any data, including, but not limited to, all sampling, analytical, monitoring, hydrogeologic, scientific, chemical, or engineering data, or any other documents or information evidencing conditions at or around the Site.

XII. RECORD RETENTION

33. Until 6 years after Respondent's receipt of the U.S. EPA's notification pursuant to Section XXVIII (Notice of Completion of Work), each Respondent shall preserve and retain all non-identical copies of records and documents (including records or documents in electronic form) now in its possession or control or which come into its possession or control that relate in any manner to the performance of the Work or the liability of any person under CERCLA with respect to the Site, regardless of any corporate retention policy to the contrary. Until 6 years after Respondent's receipt of the U.S. EPA's notification pursuant to Section XXVIII (Notice of Completion of Work), Respondent shall also instruct its contractors and agents to preserve all documents, records, and information of whatever kind, nature or description relating to performance of the Work.

34. At the conclusion of this document retention period, Respondent shall notify the U.S. EPA at least 60 days prior to the destruction of any such records or documents, and, upon request by the U.S. EPA, Respondent shall deliver any such records or documents to the U.S. EPA. Respondent may assert that certain documents, records and other information are privileged under the attorney-client privilege or any other privilege recognized by federal law. If Respondent asserts such a privilege, it shall provide the U.S. EPA with the following: 1) the title of the document, record, or information; 2) the date of the document, record, or information; 3) the name and title of the author of the document, record, or information; 4) the name and title of each addressee and recipient; 5) a description of the subject of the document, record, or information; and 6) the privilege asserted by Respondent. However, no documents, reports or other information created or generated pursuant to the requirements of this Settlement Agreement shall be withheld on the grounds that they are privileged or confidential.

35. Respondent hereby certifies that to the best of its knowledge and belief, after thorough inquiry, it has not altered, mutilated, discarded, destroyed or otherwise disposed of any records, documents or other information (other than identical copies) relating to its potential liability regarding the Site since the earlier of notification of potential liability by the U.S. EPA or the State or the filing of suit against it regarding the Site and that it has fully complied with any and all U.S. EPA requests for information pursuant to Sections 104(e) and 122(e) of CERCLA, 42 U.S.C. §§ 9604(e) and 9622(e), and Section 3007 of RCRA, 42 U.S.C. § 6927.

XIII. COMPLIANCE WITH OTHER LAWS

36. Respondent shall perform all actions required pursuant to this Settlement Agreement in accordance with all applicable local, state, and federal laws and regulations except as provided in Section 121(e) of CERCLA, 42 U.S.C. § 6921(e), and 40 C.F.R. §§ 300.400(e) and 300.415(j). In accordance with 40 C.F.R. § 300.415(j), all on-Site actions required pursuant to this Settlement Agreement shall, to the extent practicable, as determined by the U.S. EPA, considering the exigencies of the situation, attain applicable or relevant and appropriate requirements (ARARs) under federal environmental or state environmental or facility siting laws.

XIV. EMERGENCY RESPONSE AND NOTIFICATION OF RELEASES

37. In the event of any action or occurrence during performance of the Work that causes or threatens a release of Waste Material from the Site that constitutes an emergency situation or may present an immediate threat to public health or welfare or the environment, Respondent shall immediately take all appropriate action. Respondent shall take these actions in accordance with all applicable provisions of this Settlement Agreement, including, but not limited to, the Health and Safety Plan, in order to prevent, abate or minimize such release or endangerment caused or threatened by the release. Respondent shall also immediately notify the OSC or, in the event of his/her unavailability, the Regional Duty Officer, Emergency Response Branch 2, Region 5 at (312) 353-2318, of the incident or Site conditions. In the event that Respondent fails to take appropriate response action as required by this Paragraph, and U.S. EPA takes such action instead, Respondent shall reimburse the U.S. EPA all costs of the response action not inconsistent with the NCP pursuant to Section XVI (Payment of Response Costs).

38. In addition, in the event of any release of a hazardous substance from the Site, Respondent shall immediately notify the OSC at (312) 353-2318 and the National Response Center at (800) 424-8802. Respondent shall submit a written report to the U.S. EPA within 7 business days after each release, setting forth the events that occurred and the measures taken or to be taken to mitigate any release or endangerment caused or threatened by the release and to prevent the reoccurrence of such a release. This reporting requirement is in addition to, and not

in lieu of, reporting under Section 103(c) of CERCLA, 42 U.S.C. § 9603(c), and Section 304 of the Emergency Planning and Community Right-To-Know Act of 1986, 42 U.S.C. § 11004, *et seq.*

XV. AUTHORITY OF ON-SCENE COORDINATOR

39. The OSC shall be responsible for overseeing Respondent's implementation of this Settlement Agreement. The OSC shall have the authority vested in an OSC by the NCP, including the authority to halt, conduct, or direct any Work required by this Settlement Agreement, or to direct any other removal action undertaken at the Site. Absence of the OSC from the Site shall not be cause for stoppage of work unless specifically directed by the OSC.

XVI. PAYMENT OF RESPONSE COSTS

40. Payment for Response Costs.

a. Respondent shall pay the U.S. EPA all Response Costs not inconsistent with the NCP. On a periodic basis, the U.S. EPA will send Respondent a bill requiring payment that consists of an Itemized Cost Summary. Respondent shall make all payments within 30 calendar days of receipt of each bill requiring payment, except as otherwise provided in Paragraph 42 of this Settlement Agreement. Payment shall be made to the U.S. EPA by:

i. Electronic Funds Transfer (EFT) in accordance with current EFT procedures to be provided to Respondent by the U.S. EPA Region 5 and shall be accompanied by a statement identifying the name and address of the party making payment, the Lindsay Light II Site OU 20 name, and Site/Spill ID Number 05YT, and the U.S. EPA docket number for this action, or

ii. If the amount demanded in the bill is $10,000 or less, Respondent may, in lieu of the procedures in subparagraph 40(a)(i), make all payments required by this Paragraph by official bank check made payable to "U.S. EPA Hazardous Substance Superfund." Each check, or a letter accompanying each check, shall identify the name and address of the party making payment, the Lindsay Light II Site OU 20 name, U.S. EPA Region 5, the Site/Spill ID Number 05YT, and, if any, the U.S. EPA docket number for this action, and shall be sent to:

U.S. Environmental Protection Agency
Superfund Payments
Cincinnati Finance Center
P.O. Box 979076
St. Louis, MO 63197-9000

b. At the time of payment, Respondent shall send notice that such payment has been made to the Director, Superfund Division, U.S. EPA Region 5, 77 West Jackson Blvd.,

Chicago, Illinois, 60604-3590, to Mary L. Fulghum, Associate Regional Counsel, 77 West Jackson Boulevard, C-14J, Chicago, Illinois, 60604-3590, and to the U.S. EPA Cincinnati Finance Office by email at acctsreceivable.cinwd@epa.gov, or by mail to: Cincinnati Finance Office, 26 Martin Luther King Drive, Cincinnati, Ohio 45268. Such notice shall reference Site/Spill ID Number 05YT and the U.S. EPA docket number for this action.

c. All amounts to be paid by Respondent pursuant to Paragraph 40 shall be deposited in the Lindsay Light II Special Account within the U.S. EPA Hazardous Substance Superfund to be retained and used to conduct or finance response actions at or in connection with the Lindsay Light II Site, or to be transferred by the U.S. EPA to the U.S. EPA Hazardous Substance Superfund.

41. In the event that the payment for Response Costs is not made within 30 days of Respondent's receipt of a bill, Respondent shall pay Interest on the unpaid balance. The Interest on Response Costs shall begin to accrue on the date of the bill and shall continue to accrue until the date of payment. Payments of Interest made under this Paragraph shall be in addition to such other remedies or sanctions available to the United States by virtue of Respondent's failure to make timely payments under this Section, including but not limited to, payment of stipulated penalties pursuant to Section XIX.

42. Respondent may contest payment of any Response Costs billed under Paragraph 40 if it determines that the U.S. EPA has made a mathematical error, or if Respondent believes the U.S. EPA incurred excess costs as a direct result of a U.S. EPA action that was inconsistent with a specific provision or provisions of the NCP. If any dispute over costs is resolved before payment is due, the amount due will be adjusted as necessary. In the event of an objection, Respondent shall within the 30-day period pay all uncontested Response Costs to the U.S. EPA in the manner described in Paragraph 40. Within the same time period, Respondent shall establish, in a duly chartered bank or trust company, an interest-bearing escrow account that is insured by the Federal Deposit Insurance Corporation (FDIC), and remit to that escrow account funds equivalent to the amount of the contested Response Costs. Respondent shall send to the U.S. EPA OSC a copy of the transmittal letter and check paying the uncontested Response Costs, and a copy of the correspondence that establishes and funds the escrow account, including, but not limited to, information containing the identity of the bank and bank account under which the escrow account is established as well as a bank statement showing the initial balance of the escrow account. Simultaneously with establishment of the escrow account, Respondent shall initiate the Dispute Resolution procedures in Section XVII (Dispute Resolution). If the U.S. EPA prevails in the dispute, within 5 days of the resolution of the dispute, Respondent shall pay the sums due (with accrued interest) to the U.S. EPA in the manner described in Paragraph 40. If Respondent prevails concerning any aspect of the contested costs, Respondent shall pay that portion of the costs (plus associated accrued interest) for which it did not prevail to the U.S. EPA in the manner described in Paragraph 40. Respondent shall be disbursed any balance of the escrow account. The dispute resolution procedures set forth in this Paragraph in conjunction

with the procedures set forth in Section XVII (Dispute Resolution) shall be the exclusive mechanisms for resolving disputes regarding Respondent's obligation to reimburse the U.S. EPA for its Response Costs.

XVII. DISPUTE RESOLUTION

43. Unless otherwise expressly provided for in this Settlement Agreement, the dispute resolution procedures of this Section shall be the exclusive mechanism for resolving disputes arising under this Settlement Agreement. The Parties shall attempt to resolve any disagreements concerning this Settlement Agreement expeditiously and informally.

44. If Respondent objects to any U.S. EPA action taken pursuant to this Settlement Agreement, including billings for Response Costs, it shall notify the U.S. EPA in writing of its objection(s) within 10 days of such action, unless the objection(s) has/have been resolved informally. This written notice shall include a statement of the issues in dispute, the relevant facts upon which the dispute is based, all factual data, analysis or opinion supporting Respondent's position, and all supporting documentation on which such party relies. The U.S. EPA and Respondent shall have 10 days from the U.S. EPA's receipt of Respondent's written objection(s) to resolve the dispute through formal negotiations. The period for formal negotiations may be extended at the sole discretion of the U.S. EPA. If the parties are unable to reach a written agreement by the conclusion of the formal negotiation period, the U.S. EPA shall provide its Statement of Position, including supporting documentation, no later than 10 days after the formal negotiation period concludes. In the event that these 10-day time periods for exchange of written documents may cause a delay in the work, they shall be shortened upon, and in accordance with, notice by the U.S. EPA. An administrative record of any dispute under this Section shall be maintained by the U.S. EPA. The record shall include the written notification of such dispute, and the Statement of Position served pursuant to the preceding Paragraph. Upon review of the administrative record, the Director of the Superfund Division, U.S. EPA Region 5, shall resolve the dispute consistent with the NCP and the terms of this Settlement Agreement. The U.S. EPA's decision shall be incorporated into and become an enforceable part of this Settlement Agreement.

45. Respondent's obligations under this Settlement Agreement shall not be tolled by submission of any objection for dispute resolution under this Section. Following resolution of the dispute, as provided by this Section, Respondent shall fulfill the requirement that was the subject of the dispute in accordance with the agreement reached or with the U.S. EPA's decision, whichever occurs.

XVIII. FORCE MAJEURE

46. Respondent agrees to perform all requirements of this Settlement Agreement within the time limits established under this Settlement Agreement, unless the performance is delayed

by a *force majeure*. For purposes of this Settlement Agreement, a *force majeure* is defined as any event arising from causes beyond the control of Respondent, or of any entity controlled by Respondent, including but not limited to its contractors and subcontractors, which delays or prevents performance of any obligation under this Settlement Agreement despite Respondent's best efforts to fulfill the obligation. *Force majeure* does not include financial inability to complete the Work or increased cost of performance.

47. If any event occurs or has occurred that may delay the performance of any obligation under this Settlement Agreement, whether or not caused by a *force majeure* event, Respondent shall notify the U.S. EPA orally within 24 hours of when Respondent first knew that the event might cause a delay. Within 7 days thereafter, Respondent shall provide to the U.S. EPA in writing an explanation and description of the reasons for the delay; the anticipated duration of the delay; all actions taken or to be taken to prevent or minimize the delay; a schedule for implementation of any measures to be taken to prevent or mitigate the delay or the effect of the delay; Respondent's rationale for attributing such delay to a *force majeure* event if it intends to assert such a claim; and a statement as to whether, in the opinion of Respondent, such event may cause or contribute to an endangerment to public health, welfare or the environment. Failure to comply with the above requirements shall be grounds for the U.S. EPA to deny Respondent an extension of time for performance. Respondent shall have the burden of demonstrating by a preponderance of the evidence that the event is a *force majeure*, that the delay is warranted under the circumstances, and that best efforts were exercised to avoid and mitigate the effects of the delay.

48. If the U.S. EPA agrees that the delay or anticipated delay is attributable to a *force majeure* event, the time for performance of the obligations under this Settlement Agreement that are affected by the *force majeure* event will be extended by the U.S. EPA for such time as is necessary to complete those obligations. An extension of the time for performance of the obligations affected by the *force majeure* event shall not, of itself, extend the time for performance of any other obligation. If the U.S. EPA does not agree that the delay or anticipated delay has been or will be caused by a *force majeure* event, the U.S. EPA will notify Respondent in writing of its decision. If the U.S. EPA agrees that the delay is attributable to a *force majeure* event, the U.S. EPA will notify Respondent in writing of the length of the extension, if any, for performance of the obligations affected by the *force majeure* event.

XIX. STIPULATED PENALTIES

49. Respondent shall be liable to the U.S. EPA for stipulated penalties in the amounts set forth in Paragraphs 50 and 51 for failure to comply with the requirements of this Settlement Agreement specified below, unless excused under Section XVIII (Force Majeure). "Compliance" by Respondent shall include completion of the activities under this Settlement Agreement or any work plan or other plan approved under this Settlement Agreement identified below in accordance with all applicable requirements of law, this Settlement Agreement, and any plans or

other documents approved by the U.S. EPA pursuant to this Settlement Agreement within the specified time schedules established by and approved under this Settlement Agreement.

50. Stipulated Penalty Amounts – Work (Including Payments).

a. The following stipulated penalties shall accrue per violation per day for any noncompliance identified in Paragraph 50(c) i, ii, or iii:

Violation Per Day	Period of Noncompliance
$100.00	1st through 14th day
$250.00	15th through 30th day
$500.00	31st day and beyond

b. The following stipulated penalties shall accrue per violation per day for any noncompliance identified in Paragraph 50(c) iv, v, or vi:

1st Violation- Per Day Penalty	Period of Noncompliance
$100.00	1st day
$200.00	2nd day
$300.00	3rd through 5th day
$500.00	6th through 15th day
$1,000.00	16th day and beyond

2nd Violation- Per Day Penalty	Period of Noncompliance
$300.00	1st day
$600.00	2nd day
$900.00	3rd through 5th day
$1,500.00	6th through 15th
$3,000.00	16th day and beyond

c. Compliance Milestones.

i. Payment of Response Costs due 30 days after the Respondent's receipt of the U.S. EPA's billing statement.

ii. Recording the Environmental Covenant within 30 calendar days after completion of all Work required by Section VIII of this Settlement Agreement.

iii. Submit to the U.S. EPA a draft map and a final revised map of the Uninvestigated Site Area in accordance with the Work Plan.

iv. Notice required by Paragraphs 22 (a) or 22 (b).

v. 72-hour advance notice of intrusive work in Uninvestigated Site Area as required in Paragraph 26b.

vi. Failure to comply with the recorded Environmental Covenant/Institutional Control document described in Section X.

51. Stipulated Penalty Amounts - Reports. The following stipulated penalties shall accrue per violation per day for failure to submit timely or adequate reports or other written documents pursuant to Paragraphs 20 and 21:

Violation Per Day	Period of Noncompliance
$100.00	1st through 14th day
$200.00	15th through 30th day
$500.00	31st day and beyond

52. All penalties shall begin to accrue on the day after the complete performance is due or the day a violation occurs, and shall continue to accrue through the final day of the correction of the noncompliance or completion of the activity. However, stipulated penalties shall not accrue: 1) with respect to a deficient submission under Section VIII (Work to be Performed), during the period, if any, beginning on the 31st day after the U.S. EPA's receipt of such submission until the date that the U.S. EPA notifies Respondent of any deficiency; and 2) with respect to a decision by the Director of the Superfund Division, Region 5, under Paragraph 44 of Section XVII (Dispute Resolution), during the period, if any, beginning on the 21st day after the U.S. EPA submits its written statement of position until the date that the Director of the Superfund Division issues a final decision regarding such dispute. Nothing herein shall prevent the simultaneous accrual of separate penalties for separate violations of this Settlement Agreement.

53. Following the U.S. EPA's determination that Respondent has failed to comply with a requirement of this Settlement Agreement, the U.S. EPA may give Respondent written notification of the failure and describe the noncompliance. The U.S. EPA may send Respondent a written demand for payment of the penalties. However, penalties shall accrue as provided in the preceding Paragraph regardless of whether the U.S. EPA has notified Respondent of a violation.

54. All penalties accruing under this Section shall be due and payable to the U.S. EPA within 30 days of Respondent's receipt from the U.S. EPA of a demand for payment of the penalties, unless Respondent invokes the dispute resolution procedures under Section XVII (Dispute Resolution). Respondent shall make all payments required by this Section by official

bank check made payable to "U.S. EPA Hazardous Substance Superfund." Each check, or a letter accompanying each check, shall identify the name and address of the party making payment, the Site name, U.S. EPA Region 5, the Site/Spill ID Number 05YT, and, if any, the U.S. EPA docket number for this action, and shall be sent to:

U.S. Environmental Protection Agency
Superfund Payments
Cincinnati Finance Center
P.O. Box 979076
St. Louis, MO 63197-9000

and shall indicate that the payment is for stipulated penalties, and shall reference the name and address of the party making payment. At the time of payment, copies of check paid pursuant to this Section, and any accompanying transmittal letter(s), shall be sent to the U.S. EPA as provided in Paragraph 40(b).

55. The payment of penalties shall not alter in any way Respondent's obligation to complete performance of the Work required under this Settlement Agreement.

56. Penalties shall continue to accrue during any dispute resolution period, but need not be paid until 20 days after the dispute is resolved by agreement or by receipt of the U.S. EPA's decision.

57. If Respondent fails to pay stipulated penalties when due, the U.S. EPA may institute proceedings to collect the penalties, as well as Interest. Respondent shall pay Interest on the unpaid balance, which shall begin to accrue on the date of demand made pursuant to Paragraph 53. Nothing in this Settlement Agreement shall be construed as prohibiting, altering, or in any way limiting the ability of the U.S. EPA to seek any other remedies or sanctions available by virtue of Respondent's violation of this Settlement Agreement or of the statutes and regulations upon which it is based, including, but not limited to, penalties pursuant to Sections 106(b) and 122(*l*) of CERCLA, 42 U.S.C. §§ 9606(b) and 9622(*l*), and punitive damages pursuant to Section 107(c)(3) of CERCLA, 42 U.S.C. § 9607(c)(3). Provided, however, that the U.S. EPA shall not seek civil penalties pursuant to Section 106(b) or 122(*l*) of CERCLA or punitive damages pursuant to Section 107(c)(3) of CERCLA for any violation for which a stipulated penalty is provided in this Section, except in the case of a willful violation of this Settlement Agreement. Should Respondent violate this Settlement Agreement or any portion hereof, U.S. EPA may carry out the required actions unilaterally, pursuant to Section 104 of CERCLA, 42 U.S.C. § 9604, and/or may seek judicial enforcement of this Settlement Agreement pursuant to Section 106 of CERCLA, 42 U.S.C. § 9606. Notwithstanding any other provision of this Section, the U.S. EPA may, in its unreviewable discretion, waive in writing any portion of stipulated penalties that have accrued pursuant to this Settlement Agreement.

XX. COVENANT NOT TO SUE BY U.S. EPA

58. In consideration of the actions that will be performed and the payments that will be made by Respondent under the terms of this Settlement Agreement, and except as otherwise specifically provided in this Settlement Agreement, the U.S. EPA covenants not to sue or to take administrative action against Respondent pursuant to Sections 106 and 107(a) of CERCLA, 42 U.S.C. §§ 9606 and 9607(a), for the Work and Response Costs. This covenant not to sue shall take effect upon receipt by the U.S. EPA of the Response Costs due under Section XVI (Payment of Response Costs) of this Settlement Agreement and any Interest or Stipulated Penalties due for failure to pay Response Costs as required by Sections XVI (Payment of Response Costs) and XIX (Stipulated Penalties) of this Settlement Agreement. This covenant not to sue is conditioned upon the complete and satisfactory performance by Respondent of its obligations under this Settlement Agreement, including, but not limited to, payment of Response Costs pursuant to Section XVI (Payment of Response Costs). This covenant not to sue extends only to Respondent and does not extend to any other person.

XXI. RESERVATIONS OF RIGHTS BY U.S. EPA

59. Except as specifically provided in this Settlement Agreement, nothing in this Settlement Agreement shall limit the power and authority of the U.S. EPA or the United States to take, direct, or order all actions necessary to protect public health, welfare, or the environment or to prevent, abate, or minimize an actual or threatened release of hazardous substances, pollutants or contaminants, or hazardous or solid waste on, at, or from the Site. Further, nothing in this Settlement Agreement shall prevent the U.S. EPA from seeking legal or equitable relief to enforce the terms of this Settlement Agreement, from taking other legal or equitable action as it deems appropriate and necessary, or from requiring the Respondent in the future to perform additional activities pursuant to CERCLA or any other applicable law.

60. The covenant not to sue set forth in Section XX (Covenant Not to Sue by U.S. EPA) above does not pertain to any matters other than those expressly identified therein. The U.S. EPA reserves, and this Settlement Agreement is without prejudice to, all rights against Respondent with respect to all other matters, including, but not limited to:

a. claims based on a failure by Respondent to meet a requirement of this Settlement Agreement;

b. liability for costs not included within the definition of Response Costs;

c. liability for performance of response action other than the Work;

d. criminal liability;

e. liability for damages for injury to, destruction of, or loss of natural resources, and for the costs of any natural resource damage assessments;

f. liability arising from the past, present, or future disposal, release or threat of release of Waste Materials outside of the Site; and

g. liability for costs incurred or to be incurred by the Agency for Toxic Substances and Disease Registry related to the Site.

61. Work Takeover. If the U.S. EPA determines that Respondent has ceased implementation of any portion of the Work, is seriously or repeatedly deficient or late in its performance of the Work, or is implementing the Work in a manner which may cause an endangerment to human health or the environment, the U.S. EPA may assume the performance of all or any portion of the Work as the U.S. EPA determines necessary. Prior to taking over the Work, the U.S. EPA will issue written notice (including electronic mail) to Respondent specifying the grounds upon which such notice was issued and, to the extent the U.S. EPA determines there is no imminent or ongoing threat to human health or the environment, the notice will provide Respondent ten days within which to remedy the circumstances giving rise to the EPA's issuance of the notice. Respondents may invoke the procedures set forth in Section XVII (Dispute Resolution) to dispute the U.S. EPA's determination that takeover of the Work is warranted under this Paragraph. However, notwithstanding Respondent's invocation of such dispute resolution procedures, and during the pendency of any such dispute, the U.S. EPA may in its sole discretion commence and continue a Work Takeover until the earlier of (1) the date that Respondent remedies, to the U.S. EPA's satisfaction, the circumstances giving rise to the U.S. EPA's issuance of the relevant Work Takeover Notice, or (2) the date that a final decision is rendered in accordance with Paragraph 44 requiring the U.S. EPA to terminate such Work Takeover. Costs incurred by the United States in performing the Work pursuant to this Paragraph shall be considered Response Costs that Respondents shall pay pursuant to Section XVI (Payment of Response Costs). Notwithstanding any other provision of this Settlement Agreement, the U.S. EPA retains all authority and reserves all rights to take any and all response actions authorized by law.

XXII. COVENANT NOT TO SUE BY RESPONDENT

62. Respondent covenants not to sue and agrees not to assert any claims or causes of action against the United States, or its contractors or employees, with respect to the Work, Response Costs, or this Settlement Agreement, including, but not limited to:

a. any direct or indirect claim for reimbursement from the Hazardous Substance Superfund established by 26 U.S.C. § 9507, based on Sections 106(b)(2), 107, 111, 112, or 113 of CERCLA, 42 U.S.C. §§ 9606(b)(2), 9607, 9611, 9612, or 9613, or any other provision of law;

b. any claim arising out of response actions at or in connection with the Site, including any claim under the United States Constitution, the Illinois Constitution, the Tucker Act, 28 U.S.C. § 1491, the Equal Access to Justice Act, 28 U.S.C. § 2412, as amended, or at common law; or

c. any claim against the United States pursuant to Sections 107 and 113 of CERCLA, 42 U.S.C. §§ 9607 and 9613, relating to the Work or Response Costs.

These covenants not to sue shall not apply in the event the United States brings a cause of action or issues an order pursuant to any of the reservations set forth in Paragraphs 59 (b), (c), and (e) - (g), but only to the extent that Respondent's claims arise from the same response action, response costs, or damages that the United States is seeking pursuant to the applicable reservation.

63. Nothing in this Agreement shall be deemed to constitute approval or preauthorization of a claim within the meaning of Section 111 of CERCLA, 42 U.S.C. § 9611, or 40 C.F.R. § 300.700(d).

XXIII. OTHER CLAIMS

64. By issuance of this Settlement Agreement, the United States and the U.S. EPA assume no liability for injuries or damages to persons or property resulting from any acts or omissions of Respondents. The United States or the U.S. EPA shall not be deemed a party to any contract entered into by Respondents or its directors, officers, employees, agents, successors, representatives, assigns, contractors, or consultants in carrying out actions pursuant to this Settlement Agreement.

65. Except as expressly provided in Section XXII (Covenant Not to Sue by Respondents) and Section XX (Covenant Not to Sue by U.S. EPA), nothing in this Settlement Agreement constitutes a satisfaction of or release from any claim or cause of action against Respondents or any person not a party to this Settlement Agreement, for any liability such person may have under CERCLA, other statutes, or common law, including but not limited to any claims of the United States for costs, damages and interest under Sections 106 and 107 of CERCLA, 42 U.S.C. §§ 9606 and 9607.

66. No action or decision by the U.S. EPA pursuant to this Settlement Agreement shall give rise to any right to judicial review, except as set forth in Section 113(h) of CERCLA, 42 U.S.C. § 9613(h).

XXIV. EFFECT OF SETTLEMENT/CONTRIBUTION

67. Nothing in this Settlement Agreement diminishes the right of the United States, pursuant to Section 113(f)(2) and (3) of CERCLA, 42 U.S.C. § 9613(f)(2)-(3), to pursue any such persons to obtain additional response costs or response action and to enter into settlements that give rise to contribution protection pursuant to Section 113(f)(2).

68. a. The Parties agree that this Settlement Agreement constitutes an administrative settlement for purposes of Sections 113(f)(2) and 122(h)(4) of CERCLA, 42 U.S.C. §§ 9613(f)(2) and 9622(h)(4), and that Respondent is entitled, as of the Effective Date, to protection from contribution actions or claims as provided by Sections 113(f)(2) and 122(h)(4) of CERCLA, 42 U.S.C. §§ 9613(f)(2) and 9622(h)(4), or as may otherwise be provided by law, for "matters addressed" in this Settlement Agreement. The "matters addressed" in this Settlement Agreement are the Work and Response Costs.

b. The Parties further agree that this Settlement Agreement constitutes an administrative settlement for purposes of Section 113(f)(3)(B) of CERCLA, 42 U.S.C. § 9613(f)(3)(B), pursuant to which the Respondent has, as of the Effective Date, resolved its liability to the United States for the Work and Response Costs.

69. Respondent shall, with respect to any suit or claim brought by it for matters related to this Settlement Agreement, notify the U.S. EPA in writing no later than 60 days prior to the initiation of such suit or claim. Respondent also shall, with respect to any suit or claim brought against it for matters related to this Settlement Agreement, notify the U.S. EPA in writing within 10 days of service of the complaint or claim upon it. In addition, each Respondent shall notify the U.S. EPA within 10 days of service or receipt of any Motion for Summary Judgment and within 10 days of receipt of any order from a court setting a case for trial, for matters related to this Settlement Agreement.

70. In any subsequent administrative or judicial proceeding initiated by the U.S. EPA, or by the United States on behalf of the U.S. EPA, for injunctive relief, recovery of response costs, or other relief relating to the Site, Respondent shall not assert, and may not maintain, any defense or claim based upon the principles of waiver, *res judicata*, collateral estoppel, issue preclusion, claim-splitting, or other defenses based upon any contention that the claims raised in the subsequent proceeding were or should have been brought in the instant case; provided, however, that nothing in this Paragraph affects the enforceability of the covenant by the U.S. EPA set forth in Section XX.

71. Effective upon signature of this Settlement Agreement by Respondent, Respondent agrees that the time period after the date of its signature shall not be included in computing the running of any statute of limitations potentially applicable to any action brought by the United States related to the "matters addressed" as defined in Paragraph 68 and that, in any action brought by the United States related to the "matters addressed," such Respondent will not assert, and may not maintain, any defense or claim based upon principles of statute of limitations, waiver, laches, estoppel, or other defense based on the passage of time after its signature of this Settlement Agreement. If the U.S. EPA gives notice to Respondent that it will not make this Settlement Agreement effective, the statute of limitations shall begin to run again commencing ninety days after the date such notice is sent by the U.S. EPA.

XXV. INDEMNIFICATION

72. Respondent shall indemnify, save and hold harmless the United States, its officials, agents, contractors, subcontractors, employees and representatives from any and all claims or causes of action arising from, or on account of, negligent or other wrongful acts or omissions of Respondent, its officers, directors, employees, agents, contractors, or subcontractors, in carrying out actions pursuant to this Settlement Agreement. In addition, Respondent agrees to pay the United States all costs incurred by the United States, including but not limited to attorney's fees and other expenses of litigation and settlement, arising from or on account of claims made against the United States based on negligent or other wrongful acts or omissions of Respondent, its officers, directors, employees, agents, contractors, subcontractors and any persons acting on its behalf or under its control, in carrying out activities pursuant to this Settlement Agreement. The United States shall not be held out as a party to any contract entered into by or on behalf of Respondent in carrying out activities pursuant to this Settlement Agreement. Neither Respondent nor any such contractor shall be considered an agent of the United States. The Federal Tort Claims Act (28 U.S.C. §§ 2671, 2680) provides coverage for injury or loss of property, or injury or death caused by the negligent or wrongful act or omission of an employee of the U.S. EPA while acting within the scope of his or her employment, under circumstances where the U.S. EPA, if a private person, would be liable to the claimant in accordance with the law of the place where the act or omission occurred.

73. The United States shall give Respondent notice of any claim for which the United States plans to seek indemnification pursuant to this Section and shall consult with Respondent prior to settling such claim.

74. Respondent waives all claims against the United States for damages or reimbursement or for set-off of any payments made or to be made to the United States, arising from or on account of any contract, agreement, or arrangement between any one or more of Respondent and any person for performance of Work on or relating to the Site, including, but not limited to, claims on account of construction delays. In addition, Respondent shall indemnify

and hold harmless the United States with respect to any and all claims for damages or reimbursement arising from or on account of any contract, agreement, or arrangement between any one or more of Respondent and any person for performance of Work on or relating to the Site, including, but not limited to, claims on account of construction delays.

XXVI. INSURANCE

75. At least 10 days prior to commencing any on-Site work under this Settlement Agreement, Respondent shall secure, and shall maintain for the duration of this Settlement Agreement, a comprehensive general liability insurance and automobile insurance with limits of two million dollars, combined single limit, naming the U.S. EPA as an additional insured. Within the same time period, Respondent shall provide the U.S. EPA with certificates of such insurance and a copy of each insurance policy. In addition, for the duration of the Settlement Agreement, Respondent shall satisfy, or shall ensure that its contractors or subcontractors satisfy, all applicable laws and regulations regarding the provision of worker's compensation insurance for all persons performing the Work on behalf of Respondent in furtherance of this Settlement Agreement. If Respondent demonstrates by evidence satisfactory to the U.S. EPA that any contractor or subcontractor maintains insurance equivalent to that described above, or insurance covering some or all of the same risks but in an equal or lesser amount, then Respondent need provide only that portion of the insurance described above which is not maintained by such contractor or subcontractor.

XXVII. MODIFICATIONS

76. The OSC may make modifications to any plan or schedule in writing or by oral direction. Any oral modification will be memorialized in writing by the U.S. EPA promptly, but shall have as its effective date the date of the OSC's oral direction. Any other requirements of this Settlement Agreement may be modified in writing by mutual agreement of the parties.

77. If Respondent seeks permission to deviate from any approved work plan or schedule, Respondent's Project Coordinator shall submit a written request to the U.S. EPA for approval outlining the proposed modification and its basis. Respondent may not proceed with the requested deviation until receiving oral or written approval from the OSC pursuant to Paragraph 76.

78. No informal advice, guidance, suggestion, or comment by the OSC or other U.S. EPA representatives regarding reports, plans, specifications, schedules, or any other writing submitted by Respondent shall relieve Respondent of its obligation to obtain any formal approval required by this Settlement Agreement, or to comply with all requirements of this Settlement Agreement, unless it is formally modified.

XXVIII. NOTICE OF COMPLETION OF WORK

79. When the U.S. EPA determines, after the U.S. EPA's review of the Final Report, that all Work has been fully performed in accordance with this Settlement Agreement, with the exception of any continuing obligations required by this Settlement Agreement, including, *e.g.*, post-removal site controls, payment of Response Costs, and record retention, the U.S. EPA will provide written notice to Respondent. If the U.S. EPA determines that such Work has not been completed in accordance with this Settlement Agreement, the U.S. EPA will notify Respondent, provide a list of the deficiencies, and require Respondent to modify the Work Plan if appropriate in order to correct such deficiencies. Respondent shall implement the modified and approved Work Plan and shall submit a modified Final Report in accordance with the U.S. EPA notice. Failure by Respondent to implement the approved modified Work Plan shall be a violation of this Settlement Agreement.

XXIX. NOTICES AND SUBMISSIONS

80. Whenever, under the terms of this Agreement, notice is required to be given or a document is required to be sent by one Party to another, it shall be directed to the individuals at the addresses specified below, unless those individuals or their successors give notice of a change to the other Parties in writing. Written notice as specified herein shall constitute complete satisfaction of any written notice requirement of this Agreement with respect to the U.S. EPA and Respondent.

As to U.S. EPA:

Mary L. Fulghum
Cathleen M. Martwick
Associate Regional Counsel
U.S. EPA (C-14J)
77 West Jackson Boulevard
Chicago, Illinois 60604

Verneta Simon, P.E.
On-Scene Coordinator
U.S. EPA (SE-6J)
77 West Jackson Boulevard
Chicago, Illinois 60604

Gene Jablonowski
Project Manager
U.S. EPA (SR-6J)
77 West Jackson Boulevard
Chicago, Illinois 60604

Lindsay Light II, OU 20
164 East Grand Avenue
Illinois Land Trust No. 21032
Chicago, Illinois

Vanessa Mbogo
Comptroller's Office
U.S. EPA (MF-10J)
77 West Jackson Boulevard
Chicago, Illinois 60604

As to Respondent:

Jose Maldonado, President
Alex Polanco, Vice President
Old Veteran Construction, Inc.
10942 South Halsted
Chicago, Illinois 60628

Vincent S. Oleszkiewicz, Esq.
Leech Tishman
Suite 230
4225 Naperville Road
Lisle, Illinois 60532

XXX. SEVERABILITY/INTEGRATION/ATTACHMENT

81. If a court issues an order that invalidates any provision of this Settlement Agreement or finds that Respondent has sufficient cause not to comply with one or more provisions of this Settlement Agreement, Respondent shall remain bound to comply with all provisions of this Settlement Agreement not invalidated or determined to be subject to a sufficient cause defense by the court's order.

82. This Settlement Agreement and its attachment (Attachment A Site Map) constitute the final, complete and exclusive agreement and understanding among the Parties with respect to the settlement embodied in this Settlement Agreement. The parties acknowledge that there are no representations, agreements or understandings relating to the settlement other than those expressly contained in this Settlement Agreement.

XXXI. EFFECTIVE DATE

83. This Settlement Agreement shall be effective upon receipt by Respondent of a copy of this Settlement Agreement signed by the Director, Superfund Division, U.S. EPA Region 5.

IN THE MATTER OF:

Lindsay Light II, OU 20
164 East Grand Avenue
Illinois Land Trust No. 21032
Chicago, Illinois

The undersigned representative of Respondent certifies that he is fully authorized to enter into the terms and conditions of this Settlement Agreement and to bind the party he represents to this document.

Agreed this 26th day of October, 2012.

For Respondent: Standard Bank & Trust Co., as Trustee under Illinois Land Trust No. 21032, dated May 18, 2011

By X Margaret Maldonado
Margaret Maldonado

Title Primary Beneficiary of the Standard Bank & Trust Company Trust No. 21032 dated May 18, 2011

IN THE MATTER OF:

Lindsay Light II, OU 20
164 East Grand Avenue LLC
Chicago, Illinois

It is so ORDERED and Agreed this 29 day of OCTOBER, 2012.

BY: Richard C Karl

Richard C. Karl, Director
Superfund Division
United States Environmental Protection Agency
Region 5

ATTACHMENT A

Site Map

MM SURVEYING CO., INC.

5812 W. HIGGINS AVENUE
CHICAGO, ILLINOIS 60630

PROFESSIONAL DESIGN FIRM No. 184-003233

PHONE:(773)282-5900
FAX: (773)282-9424

PLAT OF SURVEY

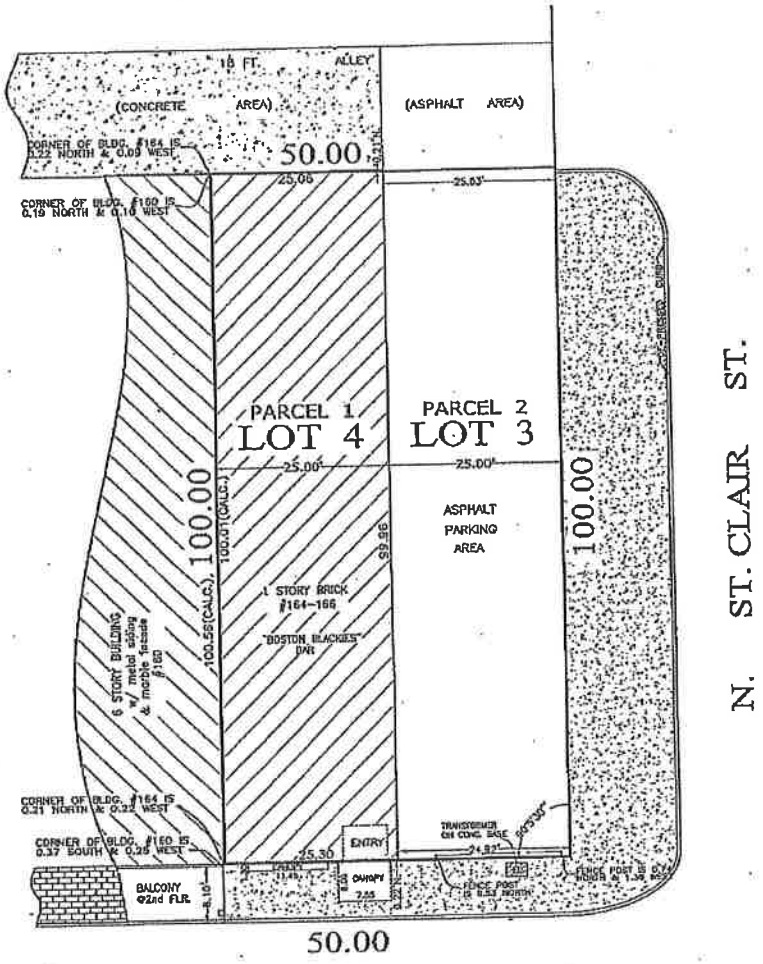
OF

NORTH
ASSUMED

PARCEL 1:
LOT 4 IN ASSESSOR'S DIVISION OF THE SOUTH 1/2 OF THE EAST 100 FEET OF THE NORTH 1/2 OF BLOCK 21 IN KINZIE'S ADDITION TO CHICAGO, BEING A SUBDIVISION OF THE NORTH FRACTIONAL 1/2 OF SECTION 10, TOWNSHIP 39 NORTH, RANGE 14, EAST OF THE THIRD PRINCIPAL MERIDIAN, IN COOK COUNTY, ILLINOIS.

PARCEL 2:
LOT 3 IN ASSESSOR'S DIVISION OF THE SOUTH 1/2 OF THE EAST 100 FEET OF THE NORTH 1/2 OF BLOCK 21 IN KINZIE'S ADDITION TO CHICAGO, BEING A SUBDIVISION OF THE NORTH FRACTIONAL 1/2 OF SECTION 10, TOWNSHIP 39 NORTH, RANGE 14, EAST OF THE THIRD PRINCIPAL MERIDIAN, IN COOK COUNTY, ILLINOIS.

TOTAL LAND AREA = 5,000 sq.ft.



LEGEND:

- CHAIN LINK FENCE
- WOOD FENCE
- CONCRETE PAVEMENT
- E.FR.P. - ENCLOSED FRAME PORCH
- O.FR.P. - OPEN FRAME PORCH
- O.BR.P. - OPEN BRICK PORCH
- O.C.P. - OPEN CONC. PORCH
- E.C. - EDGE OF CONCRETE

ORDER NO. 74355

SCALE: 1 INCH= 16 FEET

FIELDWORK COMPLETION DATE: 29 AUGUST 2008

ORDERED BY: D. XENOS & ASSOCIATES

RE: 53572

UPDATED: FEBRUARY 21, 2011

THIS PROFESSIONAL SERVICE CONFORMS TO THE CURRENT ILLINOIS MINIMUM STANDARDS FOR A BOUNDARY SURVEY.
FOR BUILDING LINES, EASEMENTS AND OTHER RESTRICTIONS NOT SHOWN HEREON, REFER TO YOUR DEED, TITLE POLICY AND LOCAL ZONING ORDINANCE, ETC.
LEGAL DESCRIPTION NOTED ON THIS PLAT WAS PROVIDED BY THE CLIENT AND MUST BE COMPARED WITH DEED AND/OR TITLE POLICY.
ALL DIMENSIONS ARE SHOWN IN FEET AND DECIMAL
NO CORNERS WERE MONUMENTED PER CUSTOMER

PROFESSIONAL LAND SURVEYOR
ZBIGNIEW DOMOZYCH
035-003758
CHICAGO ILLINOIS
STATE OF ILLINOIS

State of Illinois
ss
County of Cook

We, M M Surveying Co., Inc., do hereby certify that we have surveyed the above described property and that the plat hereon drawn is a correct representation of said survey.

Signature: Z. Domozych

Date: FEBRUARY 23-2011

REG. ILL. Land Surveyor No. 35-3758
LIC. EXP. NOVEMBER 30, 2012

EXHIBIT C
USEPA Approved Work Plan

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF: SE-5J

DEC 06 2012

Dr. Steven Kornder
AECOM
750 Corporate Parkway
Vernon Hills, Illinois 60061

RE: Work Plan Approval
Lindsay Light II/OU 20 164 East Grand Site, Chicago, Illinois

Dear Dr. Kornder:

By this letter, U.S. EPA approves the proposed Work Plan that you have submitted for this Site pursuant to the Administrative Settlement Agreement and Order on Consent (ASAOC), Docket No. V-W-13-C-002. Per our discussions, to accommodate the exigencies of the circumstances at the 164 East Grand Site, the approved Work Plan is the compilation of the documents and information listed below that includes various emails and incorporates portions of the Lindsay Light II/OU 17 211 East Grand work plan previously approved by U.S. EPA pursuant to the ASAOC for that site. For the purposes of the 164 East Grand Work Plan, any references to the site, location, or owner in the 211 East Grand work plan shall be read to refer to the site, location, and owner as those terms are defined, described, or depicted in the Lindsay Light II/OU 20 164 East Grand ASAOC. Further, there may be terms in the 211 East Grand work plan that are clearly inapplicable to the 164 East Grand Site. For instance, Appendix F, page 2, Paragraph 1.1 B.2.G states that "[n]o buildings are present within the areas proposed to be excavated." U.S. EPA's approval of the compiled work plan recognizes that any reasonable reading of the 164 East Grand Work Plan will disregard this and any other term of the 211 East Grand work plan that is inapplicable or irrelevant to the work at 164 East Grand.

The specific emails and attachments included in the approved 164 East Grand Work Plan are:

1. Steve Kornder Email to Verneta Simon dated December 5, 2012 at 1:39 pm, Subject: 164 E. Grand – Request to Proceed Pursuant to 211 E. Grand Work Plan including three pdf attachments: App F-Specs.pdf, App D-SOPs.pdf, and App E-Plans.pdf.

2. Mary Fulghum Email to Vincent S. Oleszkiewicz dated December 4, 2012 at 5:04 pm, Subject: Re: 164 E. Grand – Request to Proceed Pursuant to 211 E. Grand Work Plan.

3. Vincent S. Oleszkiewicz Email to Mary Fulghum *et al.* dated December 4, 2012 at 4:24 pm, Subject: 164 E. Grand – Request to Proceed Pursuant to 211 E. Grand Work Plan.

U.S. EPA considers the content of the e-mails and attachments referenced above as your approved Work Plan. U. S. EPA also has determined that a QAPP is not necessary because this is a non-complex site.

If you disagree that the documents listed above constitute the U.S. EPA approved Work Plan for this site, please notify me immediately by e-mail and by telephone. If you would like to discuss the requirements of the approved Work Plan further, please contact us via telephone. My cell telephone number is (312) 802-1404 and Eugene Jablonowski, Health Physicist, can be reached at (312) 886-4591. We anticipate arriving about 10:30 am on December 8 to verify your remediation, if you would like us to arrive earlier please telephone one of us.

Sincerely,

Verneta Simon

Verneta Simon, P.E.
On-Scene Coordinator

AECOM
750 Corporate Woods Parkway
Vernon Hills, IL 60061

847-279-2500 tel
847-279-2510 fax

October 23, 2012
Revised October 29, 2012

Ms. Verneta Simon, On-Scene Coordinator
US Environmental Protection Agency - Region 5
77 W. Jackson Blvd., SE-5J
Chicago, Illinois 60604-3590

RE: Interim Response Action Letter
Fill Soil Radiological Assessment and Compliance
164-166 E. Grand Ave, Chicago, Illinois

Dear Ms. Simon:

This Interim Response Action describes the fill soil radiological assessment and compliance activities that will be performed in response to the discovery of radiologically contaminated fill soil at the 164-166 E. Grand Avenue property located in Chicago, IL (referred to as "Site"). The intent of these activities is to conduct gamma screening to identify areas of radiologically contaminated fill soil within the existing trench along the western side of the building interior and within an existing soil stockpile inside the building. These actions will allow construction of the west wall footing to be completed as well as backfilling of the excavation adjacent to this foundation. Clean soil will not be placed until USEPA has been notified and USEPA has not prohibited the placement of clean soil. Currently, construction activities have been halted at the discretion of Old Veteran Construction until a gamma screening program approved by the United States Environmental Protection Agency (USEPA) can be implemented. A forthcoming plan will describe additional site activities and procedures related to radiological compliance for the continuing construction activities associated with this project.

BACKGROUND

The USEPA, via City of Chicago permits, requires radiological screening for designated Streeterville properties and rights-of-way during all subsurface earthwork activities. The initial surface gamma survey of a sub-slab portion of the Site was conducted by Huber Consultants, Inc. on October 3, 2012. This survey observed elevated gamma readings that are indicative of radiological contamination within the trench and at a single spot at the surface of the existing soil pile. In a meeting held with USEPA on October 17, 2012, AECOM discussed the findings from the earlier radiological investigation, potential actions required by the USEPA for the identified thorium contaminated fill soil, and the proposed plans for dealing with the apparent contamination and proposed gamma screening procedures that will be necessary in order to restart construction. This letter summarizes the discussions held in the meeting and provides a description of interim actions to be implemented in conjunction with the construction.

INTERIM ACTIONS

As described above, construction activities have been halted at the site until a gamma screening and contaminated soil program can be implemented pursuant to an agreed order. Currently, soil that was excavated during test pit and trenching activities along the western property edge is stockpiled along the eastern interior wall of the building. The excavation work that created the stockpile was performed to get the construction permits necessary for the future construction activities, which are necessary for the remodeling of the existing building. This interior soil stockpile impedes logistics and limits site activities due to space constraints. After gamma screening and containerizing of any radiologically contaminated soil, clean stockpiled soil may be used as backfill in order to pour the footing/cap for the western wall. However, this soil cannot be removed or used as backfill until being assessed for radiological compliance.

The following sequence of activities will be implemented to reinitiate construction. Pouring of the concrete cap and footings (Step 4) may be conducted prior to backfilling of the trench as long as the concrete work can be accomplished without the disturbance of contaminated soil. Each of the activities is briefly discussed below.

1. Sawcutting of Existing Slab – Sections of the existing slab along the trench that have been undermined will be sawcut and removed. This is necessary to allow safe entry into the trench to complete the trench gamma survey. In addition a relatively straight edge will be required in order to properly re-pour and match the existing slab. If the base of the trench cannot be surveyed before sawcutting, plastic sheeting or tarps will be stretched/placed beneath the overhanging slab sections to prevent cross-contamination of the concrete by potentially contaminated soil and allow safe retrieval of the concrete pieces.

2. Trench Gamma Survey – A gamma survey will be completed and a drawing will be produced that indicates locations within the existing trench that exceed the radiological cleanup threshold (7.1 pCi/g for the Streeterville area). Soil screening procedures that will be employed at the site are described below.

   Barrier/marker Installation – If any material exceeding the cleanup threshold of 7.1 pCi/g is proposed to be left undisturbed in the sidewall or floor of the trench, USEPA will be notified by email and phone and both the shielded and unshielded highest gamma readings of the contaminated material proposed to be left in place will be reported. Depending upon the location and gamma level or soil concentration, USEPA may determine that the contaminated material must be excavated. Based on the gamma survey results, landscape fabric or heavy plastic sheeting will be used to cover areas exceeding the field instrumentation cleanup threshold within the existing trench. The sheeting material will serve as a barrier to limit worker exposure/direct contact with contaminated soils as well as further minimize the potential generation of contaminated dust. Backfill will subsequently be placed on the fabric/plastic sheeting within the trench (see item #4 below). The fabric/sheeting will also act as a marker for future excavation, which is not anticipated to complete the planned construction activities. Areas where contaminated material has been identified but not removed/excavated will have the dimensions of their extent and location and the highest gamma readings and/or soil concentration noted in institutional controls documentation for future reference.

3. Trench Backfilling – Any material from the stockpile exceeding the field instrument threshold equivalent to the cleanup threshold of 7.1 pCi/g will be placed into a super-sack for subsequent characterization, removal and disposal. The trench will be backfilled with the clean stockpiled soil, which originated from the trench, and likely capped with a layer of CA6 stone. Soil from the stockpile will be screened prior to utilizing it as backfill. After backfilling, construction of the footing and wall along the western edge of the property will be initiated. The following activities will be performed concurrent with trench backfilling:

   - sampling of bagged material for laboratory analysis to confirm field gamma screening results and to assess if material to be shipped for disposal as radiologically-contaminated soil exhibits hazardous waste characteristics per RCRA;
   - water (via spraying) will be used to control dust during stockpile screening and backfilling activities;
   - personnel air monitoring will be performed for workers involved directly in trench surveying, soil pile screening, and backfilling activities;
   - gamma screening of the trench and soil stockpile will be performed using a shielded 2 x 2 probe;

4. Foundation Cap/Footing Installation – The foundation cap/footing will be poured after trench backfilling has been completed unless it is feasible to pour it before trench backfilling. Concrete work would only be completed first if no disturbance of contaminated soil would be necessary to complete the concrete cap and footing work.

5. Interior Surface/Slab and Exterior Park Lot Surveys – The building interior slab and exterior parking lot will be gamma screened using surface screening methods outlined below and a drawing created with the results.

METHODS

Applicable Cleanup Standard

Based upon 40 CFR 192, the USEPA has set the cleanup level as 5 pCi/g total radium (Ra-226 and Ra-228) above the background. A level of 2.1 pCi/g total radium is currently considered background for the Streeterville Investigation Area by the USEPA. Thus, radiologically-contaminated material is defined by the USEPA for the Streeterville Investigation Area as exceeding a threshold of 7.1 (pCi/g) total radium.

Field measurements will be taken of gamma radiation levels using a Ludlum 2221 scaler-ratemeter and a 2 x 2-inch sodium iodide (NaI) detector. The equipment will be calibrated to determine the gamma count in counts per minute (cpm) that is equivalent to 7.1 pCi/g. Equipment calibration will be performed at least annually using the thorium calibration blocks at the former Tronox West Chicago Rare Earth Facility.

Prior to the initiation of activities, gamma count rate background levels shall be established for each applicable survey instrument. Three locations shall be chosen in non-radiologically-contaminated areas of the Site. A one-minute integrated count shall be obtained at the surface of each location, for each survey instrument (Ludlum 2221 with 2" x 2" NaI probe). The measurements collected from each location shall be averaged to establish instrument specific background gamma count rates.

Gamma Screening Procedures

Screening will be performed in accordance with the applicable procedures as outlined in SOP-210. Gamma screening of the stockpile will be performed using a shielded 2 by 2-inch sodium iodide (NaI) gamma detector and a Ludlum Model 2221 scaler-ratemeter calibrated to the thorium calibration blocks at the former Tronox West Chicago Rare Earth Facility. Values will be recorded in cpm. The shielded probe is necessary for work within the building because the brick in the walls is making unshielded screening difficult by contributing appreciable background gamma. Higher gamma readings from brick material is not uncommon and is considered natural background due to the brick's clay content. The Stan A. Huber report of October 3, 2012 indicated that the on-contact unshielded gamma count for the interior brick walls ranged from 15,500 to 17,500 (instrument threshold equivalent to 7.1 pCi/g was 19,110 cpm).

The surface of the stockpiled soil will be initially screened and subsequently screened in 18-inch intervals or lifts. Based on the gamma survey results, the material will either be designated as "clean" and used as soil backfill or "contaminated" and immediately containerized in a super-sack for later transportation and disposal.

Trenches and any exposed surface soil will be screened using a walk-over survey methodology using a shielded 2 x 2-inch probe. Surface surveys of interior slab will be conducted using a Ludlum 2221 scaler-ratemeter and a shielded 2 x 2-inch NaI gamma detector. If radiologically-contaminated soil in excess of the Applicable Cleanup Standard is identified these areas will be designated as Exclusion Zones i.e., access restricted until a barrier (i.e., landscape fabric, plastic sheeting and/or soil) is installed to prevent direct contact with the contamination. As described in the attached Health and Safety Plan (HASP), unless a barrier is in place, Exclusion Zones will require appropriate PPE and personal air monitoring to enter. All equipment and personnel that enter an Exclusion Zone will be surveyed to verify they are clean upon leaving the Exclusion Zone. Personnel entering Exclusion Zones must be 40-hour health and safety trained.

Survey of the surface of the exterior paved parking lot will likely be able to be performed with an unshielded probe. Values will be recorded in counts per minute (cpm). The maximum value will be recorded for each grid cell and all anomalously high areas (two times the background concentration) will have the approximate limits designated on the survey data sheets. The locations will be marked in paint on the ground surface. Field screening data sheets will include recording the instrument serial number, calibration date, operator, and site grid coordinates surveyed. A grid with a 5-meter spacing will be marked by flagging at the edges of the Work Area or by paint on the ground surface within the Site. The areas between the grid points will be scanned so

as to cover 100 percent of the intra-grid areas. The interior slab survey will utilize identical methods except that a shielded probe will be used to complete the survey.

Materials Management

Soil from the Site that is not radiologically-contaminated above the Applicable Cleanup Standard may be replaced in their original locations. If not needed as backfill, soil that is not radiologically-contaminated above the Applicable Cleanup Standard may be designated to be removed from the Site and will be disposed of in accordance with applicable regulations as necessary. Soil contaminated above the Applicable Cleanup Standard will be temporarily stored on-site in super-sacks pursuant with USEPA approval. Soil that is contaminated above the Applicable Cleanup Standard will ultimately be sent to an appropriate commercial disposal facility. However, off-site shipment of material in not planned as part of this initial interim action.

Decontamination

All discarded materials, waste materials, and other field equipment and supplies will be handled in such a way to prevent the potential spread of contamination during excavation and restoration activities. Discarded items that have contacted contaminated materials will be containerized and stored for disposal at the permitted commercial disposal facility. Non-contaminated items to be discarded will be collected for disposal as general refuse waste.

HEALTH AND SAFETY PLAN (HASP) SUMMARY

A USEPA Streeterville HASP is attached. Survey activities will be conducted in accordance with the Site HASP. The HASP addresses required training, personnel protection equipment, general work precautions, and medical monitoring among other issues. In general, as radiologically-contaminated soil above the Applicable Cleanup Standard is detected the areas will be designated as Exclusion Zones and will require appropriate PPE and personal air monitoring to enter. All equipment and personnel that enter an Exclusion Zone will need to be frisked/surveyed to verify they are clean upon leaving the Exclusion Zone. Personnel entering Exclusion Zones must be 40-hour health and safety trained.

Potential Hazards

Potential hazards that could be encountered during the removal activities include contact with contaminated materials and the hazards associated with construction work. Contaminants of concern include the entire decay series for U-238 and Th-232. Radiological and air monitoring as described in this letter will be performed during excavation to define the presence of radiological contaminants.

The mechanisms for exposure to the radiologically-contaminated soil material are direct exposure, inhalation, ingestion and eye/skin contact. The primary mechanism of exposure is direct exposure to external gamma radiation. Workers will be instructed in appropriate measures to protect against exposure to the above materials, and PPE will be worn until monitoring shows PPE is not necessary.
Physical hazards which might be encountered at this Site include but are not limited to the following:

Construction equipment (front-end loaders, track excavators, trucks, compactors, bulldozers);
Power tools (saws, drills, jack hammers, compactors);
Heat and cold stress;
Overhead power lines;
Excavations;
Confined space;
Noise;
Demolition of structures;
Slip, trip and fall conditions, especially during wet or freezing periods; and
Buried utilities which may or may not be live.

Additional details on these and other safety provisions are addressed in the HASP.

Training and Communications

Site and project specific radiation and health and safety training will be provided for all on-site personnel prior to work on the Site. All personnel required to work in the Exclusion Zone or Contamination Reduction Zone will complete training conforming to the requirements of 29 CFR 1910.120(e) including 40-hours of initial hazardous waste site worker training. Where appropriate, they will have 8-hours of annual refresher training, and 8-hour supervisor training as appropriate.

All site personnel will be trained and briefed on radiation basics, anticipated hazards, equipment to be worn, safety practices to be followed, contamination prevention practices, emergency procedures, radiation basics and communications. Procedures for leaving the Exclusion Zone shall be planned and implemented prior to going on-site. Work Areas and decontamination procedures will be established based on expected site conditions, and updated as necessary during construction. Other guidelines such as heat and cold stress, excavation safety and confined space are included within the HASP.

In addition to this formal health and safety training, "tailgate" safety meetings will be held daily, or more frequently, dependent on safety issues arising during the project. These meetings may be led by the field team leader or the worker's foremen and every employee must sign in before beginning work. The subject covered and persons present will be recorded for each meeting and kept as part of the project records. Health and safety incidents and monitoring results will be discussed in the tailgate safety meetings, when appropriate.

Visitors to the Site will be briefed on the requirements of the HASP before being allowed within the Work Area, and will be accompanied by a foreman or supervisor whenever possible.

Personal Protective Equipment

Disposable coveralls, steel-toed work shoes, boot covers, hard hat, safety glasses and gloves will also be required in all Exclusion Zones. Prior to exiting any Exclusion Zones, personnel will pass through decontamination, disposal of all appropriate PPE, and frisking/surveying procedures as described in the HASP. Personnel operating in Exclusion Zones will be required to have personal air monitors (PAMs).

Air Quality - Personal Exposure Monitoring

Air monitoring is generally conducted for the purpose of documenting and, if detected, initiating measures to control airborne contamination. If the volume of contaminated soil that will be excavated is minimal (measured in yards rather than hundreds of yards), the potential to create a fugitive dust issue is reduced significantly. The activities being undertaken are primarily the screening and backfilling of the existing excavations. Excavation and/or remediation of in-place contamination is not planned. Therefore, the only potential handling of contaminated soil during this initial response action will occur during the screening of the existing stockpiles.

The principal objectives of the air monitoring activities are to:

Ensure worker and general population safety and provide radiological control information;
Evaluate work procedures and site control measures. In addition to identifying the need for corrective action, air monitoring also documents the effectiveness of such control actions; and
Measure releases of airborne radioactivity (should any occur) and ensure that people working in the area are not exposed to radiation above acceptable limits.

A primary requirement of dust control is "no visible dust" during activities associated with contaminant removal. Soil handling areas where contaminated soil may be present will be required to have no visible dust. Fugitive dust generation may be caused by a range of activities including excavation, loading and dumping. Since the interior soil stockpile is relatively dry, water will be applied during the course of excavation and handling activities to prevent, mitigate or reduce dust.

Personnel operating in Exclusion Zones will be required to have personal air monitors (PAMs). Procedures for personal air monitoring are discussed in the HASP and SOP-212. Lapel samplers worn for personal air monitoring will be utilized for airborne radioactivity monitoring. Air filters will be analyzed on a daily basis and additional evaluation of samples will be performed when determined necessary based on elevated results.

Radiologically-contaminated soil from the soil stockpile above the Applicable Cleanup Standard will be loaded directly into the super-sacks to eliminate future potential contaminated dust generation as the material is identified. This contaminated soil will be stored on-site in labeled super-sacks.

COMPLETION DOCUMENTATION

An objective of this action is to document the screening activities, as well as the identification and handling of radiologically-contaminated soil should it be encountered during these initial activities. The following types of data will be generated during the project:

Surface gamma survey records;
Soil sampling records (if performed);
Fixed laboratory soil analyses data, if performed (AECOM subcontract laboratories); and
Air quality (personnel) sampling/analytical records.

The results of the initial investigation work will be presented in a short letter report. The report will provide a summary of surveyed portions of the Site and locations of radiologically-contaminated material remaining above the Applicable Cleanup Standard. The report will include field data, laboratory results, documentation of the volume of material removed and its disposal location. The draft report will be submitted within 60 days of completion of the work and on-site investigations. AECOM will incorporate U.S. EPA's comments, if any, and submit the final report within 15 days of receiving U.S. EPA's written comments, if any, on the draft report.

Should you have any questions with regard to this Interim Action Letter, please contact the undersigned at (847) 279-2500. We thank you again for your cooperation and rapid response as we initiate this project.

Yours sincerely,

AECOM Technical Services, Inc.

Steven C. Korndor, Ph.D.
Senior Project Geochemist

Daniel P. McHale, PG
Project Manager

Attachments:

SOPs 210 and 212
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cc:

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164-166 EAST GRAND AVE
CHICAGO, IL 60611

STANDARD OPERATING PROCEDURE

Title: Gamma Radiological Surveys

Document: SOP-210

Revision Number:

Date: October 23, 2012

Replaces: New

GAMMA RADIOLOGICAL SURVEYS

1.0 PURPOSE

This procedure provides protocols for conducting gamma radiological surveys for potentially contaminated soil and/or fill material.

2.0 SCOPE

Radiological surveys will be performed at the designated Site as part of the surface screening, excavation, and verification surveying programs.

3.0 REFERENCES

- NUREG 1507 – *Minimum Detectable Concentrations With Typical Radiation Survey Instruments for Various Contaminants and Field Conditions*
- NUREG 1575, Rev. 1 - Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)

4.0 EQUIPMENT AND MATERIALS

The following equipment may be used as part of the survey programs. Other equipment may be substituted if necessary because of availability of the items listed or the conditions encountered at the site.

- Trimble Pathfinder Pro XR 4.1 global positioning system (GPS), or equivalent (optional).
- Ludlum Model 44-10 2 x 2 inch sodium iodide (NaI) (Tl) gamma detector.
- 6-inch collimated lead shield for detector.
- Ludlum Model 2221 portable scaler ratemeter analyzer.

5.0 INSTRUCTIONS FOR RADIOLOGICAL SURVEY

5.1 Establishment of Background Gamma Count Rate

5.1.1 The gamma count rate background levels shall be established for each applicable survey instrument. Six randomly selected locations of similar media (i.e., paved, landscaped, etc.) shall be chosen in non-radiologically impacted areas of the Site. A one minute integrated count shall be obtained at the surface of each location for each survey instrument (Ludlum 2221 with 2 x 2 in NaI probe). The measurements collected from each location shall be averaged to establish an instrument specific background gamma count rate.

5.2 Land Surface Survey Procedure - Manual

5.2.1 Establish a Grid Network

5.2.1.1 Two perpendicular baselines will be established.

5.2.1.2 A grid along the baseline will be established using cloth or steel tape and a compass, if necessary. Stakes, survey flags, or paint will be placed as needed to delineate grid or traverse lines. The grids will be spaced about twenty feet apart.

5.2.1.3 The baseline, permanent structures, areas of remediation, and other areas of interest will be illustrated in the field logbook.

5.2.2 Gamma Survey Procedure – Manual Data Recording

5.2.2.1 The Ludlum ratemeter is set for 2 second time-weighted average count rate.

5.2.2.2 Hold the survey meter probe base parallel to the ground surface at a height as close as practical and not more than 3 inches from the ground surface. Note: It is important to keep the meter at a consistent height since counts will vary with the distance from the surface.

5.2.2.3 Walk along grid lines at a maximum speed of about 0.5 meters per second (1 mile per hour). Grid will be traversed with a serpentine pattern, spaced 3 feet apart.

5.2.2.4 Identify locations with count rates greater than twice the background count rate and record them or the Radiation Survey Form – Surface Gamma Scan.

5.3 Land Surface Survey Procedure – Continuous Data Logging with GPS

5.3.1 Gamma Survey Procedure

5.3.1.1 Position the survey meter probe base parallel to the ground surface at a height as close as practical and not more than 3 inches from the ground surface. Note: It is important to keep the meter at a consistent height since counts will vary with the distance from the surface.

5.3.1.2 Traverse the survey area at a maximum speed of about 0.5 meters per second (1 mile per hour). The survey area will be traversed in a serpentine pattern, spaced 3 feet apart.

5.3.1.3 Ludlum and GPS equipment will be interfaced with a computer/data logger that will collect gamma surface readings, and the associated GPS coordinates, at two second intervals.

5.3.1.4The GPS coordinates and gamma survey results will be plotted with locations exhibiting gamma count rates greater than twice background highlighted.

5.4 Radiological Survey of On-Site Materials

5.4.1 Material that is excavated and placed in the clean stockpile will be surveyed two times. The first survey will be performed prior to excavation activities, if the excavation can be entered safely.

5.4.2 The second survey will be performed during the excavation of the non-contaminated soil.

The soils will be surveyed before they are placed in the stockpile. Based on the gamma scan, the material will either be designated as contaminated material and immediately loaded for transportation and disposal or tentatively designated as clean and stockpiled for subsequent soil sampling per Standard Operating Procedure (SOP)-214.

5.5. Daily Surveys

5.5.1 Routine daily surveys shall be performed for each day of operations at the site.

5.5.2 The routine surveys will monitor areas in the immediate vicinity of excavations and along soil movement paths to ensure that radiation levels are not affected by activities.

5.5.3 Routine surveys shall be documented by preparing a drawing of the survey results in the field logbook, indicating either the location and value of individual measurements, or contours of the measured gamma field.

5.5.4 Surveys of excavation areas will be made at the request of the Field Team Leader to assess the progress of the removal. These surveys will not be documented, but will be used by the Field Team Leader to manage the excavation.

5.6 Pre-Verification or Verification Survey

5.6.1 Upon completion of remediation excavation activities, either a pre-verification survey shall be performed to ensure that the excavation is ready for a final verification survey by regulatory authority (i.e., United States Environmental Protection Agency (USEPA) and/or Illinois Environmental Protection Agency (IEMA)) or a verification survey shall be performed to ensure that the excavation is ready for backfill based on the approval of the regulatory authority.

5.6.2 The survey is conducted at the same time as the excavation work phase. The survey method is performed as specified in Sections 5.2 and/or 5.3. Upon completion of the survey and excavation phase, a Notification of Successful Pre-Verification or Verification is sent to the regulatory authority requesting a final verification survey or approval to backfill.

5.7 Site Grading Survey

5.7.1 Surveys will likely be conducted prior to or at the same time as the grading activities and will be performed as specified in Sections 5.2 and/or 5.3 of this SOP.

5.7.2 The corners or boundaries of the area to be surveyed will be tied into a site-wide coordinate/survey network. Stakes, survey flags, or paint will be placed along the boundaries of the survey area using a cloth/steel tape or wheel at approximately 20 foot intervals to subdivide the area into 20 x 20 foot areas.

5.7.3 Each 20 x 20 foot area will be traversed using a line spacing of approximately 4 foot. Readings greater than twice background will be painted and flagged for further investigation.

5.7.4 The maximum gamma count and readings over twice background will be recorded on the radiation survey form for site grading. Permanent structures and other issues of interest also will be included on the radiation survey form.

5.8 Caisson Construction Radiological Surveying

5.8.1 Procedures for Caisson Probe Test Pits. Note: These procedures will only be implemented if caissons are to be constructed at the Site.

5.8.1.1 The ground surface will be surveyed for elevated gamma radiation prior to beginning excavation. Excavation monitoring will include three survey efforts: 1) surveys of the excavation walls and floor until native sand is encountered, 2) surveys of the excavated fill while still in the excavator bucket, and 3) surveys of the excavation spoil pile.

5.8.1.2 Excavation will proceed in lifts not to exceed 18 inches per lift. The excavation walls and floor will be surveyed at each 18 inch lift until native sand is encountered. Additionally, the excavation spoil pile will be surveyed as excavation proceeds. Appropriate sloping of the test pit walls will be required to allow safe access for persons to enter the excavation for surveying the walls and floor. If the excavation is of such a dimension to preclude safe access of personnel to survey the walls and floor, the excavator bucket may be used to collect representative material from test pit and place the material in a spoil pile. Surveys of the spoil pile may be used to characterize the in-place material.

5.8.1.3 If elevated gamma radiation measurements are noted, equal to or exceeding twice the background gamma count, the excavation will proceed in thinner lifts, 6 to 12 inches. If the excavated fill exceeds the applicable cleanup standard, the radiologically-impacted fill will be staged on plastic separate from the clean soil and the pile will be marked with radiation rope. Alternatively, the impacted fill will be loaded directly into a Baker type box or super-sack.

5.8.1.4 Excavation equipment that has contacted radiologically-impacted fill will be surveyed with a Ludlum Model 3 Pancake Probe for elevated radioactivity. Indications of elevated radioactivity will require decontamination in accordance with the Work Plan SOP 347, Decontamination. Equipment in contact with the radiologically-impacted fill will be documented as clean through a swipe survey and alpha radiation count using the Ludlum Model 220 and Model 43-10 Alpha counter, in accordance with the Work Plan SOP 345, Survey for Surface Contamination and Release of Equipment for Unrestricted Use.

5.8.2 Procedures for Surveying during Caisson Installation

5.8.2.1 Areas previously screened to native soil will not be resurveyed. Auger spoils from caisson borings through unscreened fill (including fill from below the groundwater table) will be screened after the materials are removed from the borehole.

5.8.2.2 When practical, spoil on the caisson augers will be screened before being spun off. If the field screening indicates elevated gamma measurements, the auger spoil will be spun off onto an area covered with plastic to temporary contain the material for later placement in containers for offsite transport and disposal. Clean fill will be spun off and handled as appropriate for soil management.

5.8.2.3 Management of impacted fill during caisson construction will consist of the following. Radiation-trained laborers or excavating equipment will place that fill into approved containers (Baker type boxes or super-sacks, depending on apparent volume).

5.8.2.4 Prior to moving to a new location the Health Physics Technician will release the auger and other equipment that may have come in contact with Impacted fill using SOP-345. Decontamination procedures are outlined in the Work Plan SOP 347.

5.8.3 Required Documentation

5.8.3.1 Caisson locations found to contain impacted fill and will be recorded. The background gamma count and maximum gamma radiation reading will be noted, along with the equipment specific threshold indicative of 7.1 pCi/g total radium and the depth at which the impacted fill material was encountered. Records will also identify any samples taken, the person(s) conducting the monitoring, the date the work was started and completed, and equipment serial numbers.

AECOM

164-166 EAST GRAND AVE
CHICAGO, IL 60611

STANDARD OPERATING PROCEDURE

Title: Air Monitoring Procedure

Document: SOP-212

Revision Number: 0

Date: October 23, 2012

Replaces: New

AIR MONITORING PROCEDURE

1.0 INTRODUCTION

The Air Monitoring Procedure provides for measuring the concentration of radioactive airborne dust that could be generated and emitted into the atmosphere as a result of the excavation, moving, and loading activities planned at the Site. The objectives of data collection for air monitoring activities are as follows:

- Collect airborne radioactivity data for the purpose of determining the exposure of workers participating in Site activities to airborne particulates
- Collect airborne radioactivity data to measure releases of airborne radioactivity to the environment and ensure that people living and working in the surrounding areas of the Site are not exposed to radiation above acceptable limits
- Collect airborne radioactivity data to evaluate work procedures and Site control measures for the purpose of keeping exposures to both workers and the general public as low as reasonably achievable (ALARA).

2.0 REGULATORY REQUIREMENTS AND ADMINISTRATIVE LIMITS

As specified in 10 Code of Federal Regulations (CFR) Part 20 (unless more restrictive in 32 Illinois Administrative Code (IAC) 340) the licensee must demonstrate compliance with the dose limits for individual members of the public. The Site Air Monitoring Plan is based on being able to demonstrate that the average concentrations of radioactive materials in gaseous and liquid effluents at the boundary of the unrestricted area do not exceed the limits specified in Table 2 of Appendix B to 10 CFR 20. The radionuclides in the thorium and uranium series that could potentially be encountered during Site activities are listed in Table 1 of the Air Monitoring Plan. Th-232 has the most restrictive concentrations for both the Derived Air Concentration (DAC) and Air Effluent Limits.

Th-232 Class W DAC=5×10^{-13} µCi/ml Air Effluent=4×10^{-15} µCi/ml

Both worker exposure to airborne particulates and effluent release limits will be based on Th-232.

3.0 AIR MONITORING EQUIPMENT AND MATERIALS

- Staplex Model TFIA High Volume Air Samplers (or equivalent)
- Gilan Model BDXII Low Volume Personal Air Sampler (or equivalent)
- Staplex Model TFA810 "Ashless" Filter Papers – 95% collection efficiency of 1 micron particles. Effective efficiency of 70% (penetration absorption 30%)
- Zefon Model 739 MCE Filter Cartridges – 37 millimeter (mm) x 0.8 micrometer (µm) membrane filters
- Ludlum Model 2200 Scaler w/ Model 43-10 alpha scintillation detector
- Radiological Air Sample Data Form – Area Monitors, Form Standard Operating Procedure (SOP) 212-10
- Radiological Air Sample Data Form – Personal Air Monitors, Form SOP 212-11

4.0 SITE AIR MONITORING PROCEDURE

4.1 Background Air Quality

One downwind, high volume air sample shall be collected for a minimum of forty hours (five eight-hour days) prior to the commencement of excavation activities. This sample shall be analyzed the day after collection and then again after four days to allow for the decay of short lived radon and thoron daughters. The count, after four days decay, will serve as the official measurement of the background airborne alpha concentration. Future results during Site operations should be compared to this value to see if further engineering controls or procedural changes are warranted.

4.2 Perimeter Air Monitoring – High Volume Samplers

Four air monitoring locations shall be used during all excavation activities. These monitoring units will be at the property boundary or no more than 200 feet from the limits of the areas anticipated to be excavated. Samples shall be collected during all operations where potentially contaminated soils are being excavated, moved, or loaded. One monitor shall be placed on each perimeter of the site (North, South, East, and West) and collect samples at a height between one and two meters (four and eight feet) above the ground. Monitors will be located so as to provide unobstructed air flow from the source to the monitors. Flow rate through air samplers shall remain between 20 and 60 cubic feet per minute. Air sample filters shall be collected and replaced daily and submitted to the laboratory for analysis. Samples analyzed from the perimeter high volume monitors shall be used to determine the amount of airborne radionuclides leaving the Site.

4.3 Personal Air Monitoring – Lapel Samplers (Low Volume)

All workers participating in Site activities that involve the excavation, movement, or loading of potentially contaminated soils within a radiological exclusion zone shall wear a Personal Air Monitor (PAM) to evaluate the air quality in the worker's breathing zone. The Health and Safety Coordinator may require that additional personnel wear PAMs if there is a potential for that worker to encounter airborne particulates during Site operations. Samples shall be collected the entire time a worker is inside the exclusion zone and the cumulative time recorded. Flow rate through air samples shall remain between 2 and 4 liters per minute. Air sample filters shall be collected and replaced daily and submitted to the laboratory for analysis. Samples analyzed from the PAMs shall be used to determine potential contributions to worker's dose from airborne radionuclides.

5.0 AIR SAMPLE ANALYSIS

The Th-232 decay series contains seven alpha-emitting nuclides: Th-232, Th-228, Ra-224, Rn-220, Po-216, Bi-212 and Po-212. Of these, the first three nuclides can be assumed to be in complete equilibrium. The noble gas Rn-220 (thoron) may be ejected from the original matrix by recoil from the alpha particle decay of Ra-224. The fraction of Rn-220 that is removed via emanation is dependent on several variables, and is assumed to range from 10% to 40%. The emanating fraction is assumed to be transported away from the original matrix. If 40% of the Rn-220 escapes, the activity of the Rn-220 and its three alpha-emitting progeny nuclides will be at 60% of the Th-232 activity. These four alpha-emitting nuclides produce a total of 3.35 alpha emissions per Rn-220 decay. Since the Rn-220 activity is 60% of the Th-232 activity, these four nuclides only emit the equivalent of two alpha particles per Th-232 decay. These two alphas when combined with the three alpha particles from the nuclides in full equilibrium with the parent result in the total emission of the five alpha particles. Thus, the Th-232 contribution will be one-fifth or 20% of the total alpha activity.

For the reasons stated above, gross alpha concentrations shall be divided by a factor of five to determine the air concentration of Th-232, which is the most limiting of the applicable air effluent concentration limits ($4x10^{-15}$ microCuries per milliliter (μCi/ml)).

5.1 High Volume Sample Analysis

A 1.75 inch diameter cutout shall be obtained from each 8 x 10 inch high volume sample collected. All data pertaining to the sample shall be included on the *Radiological Air Sample Data Form – Area Monitors* worksheet. This worksheet contains the calculations required to determine total sample volume and sample concentration.

Each sample shall be analyzed the day after collection for gross alpha concentration. The minimum counting time is 30 minutes for Th-Alpha. The "day after" count will serve as a comparison to identify high gross counts from the previous day. It is expected that naturally occurring radon and thorium daughters will interfere with analysis, so the sample must be reanalyzed in four days. Thoron (Rn-220), if present in

significant amounts, will require up to four days to allow for the decay of its Pb-212 daughter (10.6 hour half life). The count, after four days decay, will serve to be the official measurement of Th-Alpha.

Th-232 is the most restrictive of the applicable radionuclides that may be present during Site operations. The Th-232 contribution will account for 20% of the total alpha activity, so each gross alpha count must be divided by five to determine Th-232 concentration.

Multiple concentration measurements improve both precision and detection capability. Although air samples shall be counted the following day (and again four days later), effluent releases shall be reported on a weekly basis using the following calculation:

Equation A.9 NUREG 1400

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

where C = effluent concentration in µCi/ml
T_s= duration of sample collection

Sample concentration shall be determined using the following calculation:

Equation 6.9 *NUREG 1400*

$$C = \frac{R_n}{EFKT_sCf(5)}$$

Where: $R_n = R_g - R_b = T_g/N_g - T_b/N_b$
E = fractional filter efficiency
F = air flow rate through the air sampler, cm^3/min
Cubic feet per hour x 28.316 liters/cfh x 1000 ml/ liter
K = Counting efficiency in cpm/ µCi
T_s = duration of sample collection
Cf = collection vs. analyzed ratio: conversion factor = 0.035

** note: Cf is not part of original NUREG calculation. It has been added to account for the fact that we are only analyzing 3.5% of total filter (i.e., a 1.75 inch circle from an 8 X 10 inch filter minus the 0.3 inch border covered by the filter holding plate).

5 = Samples are analyzed for gross alpha activity. Gross alpha concentration is to be divided by five to determine Th-232 concentration

5.2 Personal Air Monitor Sample Analysis

Personal Air Monitor (PAM) samples shall be analyzed in the same manner as the high volume perimeters samples. The only exceptions are that samples may be collected over the course of one week and that calculations are performed on a different worksheet – *Radiological Air Sample Data Form – PAM's, Form SOP 212-11.*

The action level for airborne radioactivity shall be 30% of the Derived Air Concentration (DAC) for Th-232 (DAC=$5x10^{-13}$ µCi/ml). When PAM analysis indicates that concentrations have reached 1.5 x 10^{-13} µCi/ml, Level C protection may be considered. It is not anticipated that airborne concentrations will reach this level. Engineering controls, such as wetting of soils, and procedural changes shall be implemented to keep airborne concentrations ALARA.

At the conclusion of the project, data obtained from PAM's shall be used to determine a dose from airborne radionuclides for each monitored worker.

6.0 INVESTIGATIONS AND CORRECTIVE ACTIONS

The Health and Safety Coordinator will perform investigations and responses consisting of one or more of the following actions in the event that Action Levels are exceeded:

- Verification of laboratory data and calculations.
- Analyze and review probable causes.
- Evaluate need for reanalysis or additional analysis on original sample.
- Evaluate need for resampling.
- Evaluate need for sampling of other pathways.
- Evaluate need for notifications to regulators
- Dose assessments/bioassays.

7.0 ATTACHMENTS

- Table 1 *Derived Air Concentrations (DACs) and Effluent Air Concentrations of Selected Radionuclides in the Uranium and Thorium Series*
- Minimum Detectable Concentration Calculation – Area Monitors
- Minimum Detectable Concentration Calculation – PAM's
- Radiological Air Sample Data Form – Area Monitors, Form SOP 212-10
- Radiological Air Sample Data Form – PAM's, Form SOP 212-11

TABLE 1

Derived Air Concentrations (DACs) and Effluent Air Concentrations of Selected Radionuclides in the Uranium and Thorium Series

Radionuclide	Class	10 CFR 20	
		DAC (μCi/ml)	Air Effluent (μCi/ml)
^{238}U	D W Y	$6x10^{-10}$ $3x10^{-10}$ $2x10^{-11}$	$30x10^{-12}$ $1x10^{-12}$ $6x10^{-14}$
^{234}Th	W Y	$8x10^{-8}$ $6x10^{-8}$	$3x10^{-10}$ $2x10^{-10}$
^{234}U	D W Y	$5x10^{-10}$ $3x10^{-10}$ $2x10^{-11}$	$3x10^{-12}$ $1x10^{-12}$ $5x10^{-14}$
^{230}Th	W Y	$3x10^{-12}$ $6x10^{-12}$	$2x10^{-14}$ $3x10^{-14}$
^{226}Ra	W	3x10-10	$9x10^{-13}$
^{222}Rn	With Daughters Removed With Daughters Present	$4x10^{-8}$ $3x10^{-8}$ or 0.33 of working level	$1x10^{-8}$ $1x10^{-10}$
^{214}Pb	D	$3x10^{-7}$	$1x10^{-9}$
^{214}Bi	D W	$3x10^{-7}$ $4x10^{-7}$	$1x10^{-9}$ $1x10^{-9}$
^{210}Pb	D	$1x10^{-10}$	—
^{232}Th	W Y	$5x10^{-13}$ $1x10^{-12}$	$4x10^{-15}$ $6x10^{-15}$
^{228}Ra	W	$5x10^{-10}$	$2x10^{-12}$
^{228}Th	W Y	$4x10^{-12}$ $7x10^{-12}$	$3x10^{-14}$ $2x10^{-14}$
^{220}Rn	With Daughters Removed With Daughters Present	$7x10^{-8}$ $9x10^{-9}$ or 1.0 working level	$2x10^{-8}$ $3x10^{-11}$
^{212}Pb	D	$2x10^{-8}$	$5x10^{-11}$
^{212}Bi	D W	$1x10^{-7}$ $1x10^{-7}$	$3x10^{-10}$ $4x10^{-10}$
^{228}Ac	D W Y	$4x10^{-9}$ $2x10^{-8}$ $2x10^{-8}$	$2x10^{-11}$ $8x10^{-11}$ $6x10^{-11}$
^{234m}Pa	W Y	$3x10^{-6}$ $3x10^{-6}$	$1X10^{-8}$ $9x10^{-9}$
^{235}U	D W Y	$6x10^{-10}$ $3x10^{-10}$ $2x10^{-11}$	$3x10^{-12}$ $1x10^{-12}$ $6x10^{-14}$
^{231}Pa	W Y	$6x10^{-13}$ $2x10^{-12}$	$6x10^{-15}$ $8x10^{-15}$
^{227}Ac	D W Y	$2x10^{-13}$ $7x10^{-13}$ $2x10^{-12}$	$1x10^{-15}$ $4x10^{-15}$ $6x10^{-15}$
^{227}Th	Y W	$1x10^{-10}$ $1x10^{-10}$	$5x10^{-13}$ $5x10^{-13}$

FORM SOP 212-10

RADIOLOGICAL AIR SAMPLE DATA FORM – AREA MONITORS

Equation:

Volume (V) = (Pump ml/min.) (Total Sample Time) (count/sample conversion)
Multiply Cubic Feet by 28.316 to Obtain Liters
Ml/min = (L/min.) (1000 ml/L)

SAMPLE COLLECTION

Sample #	Per. By	Date	Sample Start TIme	Sample End Time	Total Sample Time	Cubic Ft/min. (CFM)	Count vs. Sampled Conv.	Total Sample Volume (ml)

Equation: Actual Activity = Activity (A) - Background (B)

$$\text{Activity (A)} = \frac{\text{(Net CPM) (1/Eff.)}}{\text{(V) (2.2 E + 6 dpm/uCi) (filter retention factor) (5)}}$$

Sample #	Cal. By	Date	Gross Counts	Net CPM	Detector Efficiency (EFF)	Sample Volume Analyzed (ml)	Sample Concentration (A)µCi/ml	Background Activity (B)µCi/ml	Actual Concentration µCi/ml
4-day recount									

Filter retention factor/absorption correction = 0.7 for Staplex 8x10 ashless paper filter
= 1.0 for 37mm PAM membrane filters

Note: Activity is divided 5 due to the Thorium daughters that are counted with an open window (gross alpha)

Conversion factor for volume analyzed vs. volume sampled for 1.75" diameter cut-out = 0.035

30 minute background count for _____ is _____ cpm
date

30 minute background count for _____ is _____ cpm
date

FORM SOP-212-11

RADIOLOGICAL AIR SAMPLE DATA FORM – PAM'S

Equation:

Volume (V) = (Pump liters/min.) (Total Sample Time in minutes) (1000 ml/liter)

Sample Collection

Person Wearing Monitor	Pump #	Sample #	Date	Sample Start Time	Sample End Time	Total Sample Time	Cubic liters/min. LPM	Total Sample Volume (ml)

Equation: Actual Activity = Activity (A) - Background (B)

Activity (A) = $\frac{\text{(Net CPM) (1/Eff.)}}{\text{(V) (2.2 E + 6 dpm/uCi) (filter retention factor) (5)}}$

Sample Analysis

Sample #	Cal. By	Date	Gross Counts	Net CPM	Detector Efficiency (EFF)	Sample Volume Analyzed (ml)	Sample Concentration (A)µCi/ml	Background Activity (B)µCi/ml	Actual Concentration µCi/ml

Filter retention factor/absorption correction = 0.7 for Staplex 8x10 ashless paper filter
= 1.0 for 37mm PAM membrane filters

Note: Activity is divided 5 due to the Thorium daughters that are counted with an open window (gross alpha)

30 minute background count for _____ (date) is _____ cpm

30 minute background count for _____ (date) is _____ cpm

MINIMUM DETECTABLE CONCENTRATION CALCULATION – PAMS
Sensidyne Personal Air Monitor Samples analyzed on Ludlum 43-10 Alpha Counter

$$MDC = \frac{2.71}{n\,E\,F\,K\,T_g\,T_g} + \frac{3.29\,\sqrt{Rb\left[\frac{1}{Tb}+\frac{1}{Tb}\right]}}{n^{1/2}\,E\,F\,K\,T_s}$$

n = number of sampling intervals
E = fractional filter efficiency
F = airlow rate through the sampler in cm^3/min
K = counting efficiency in cpm/μCi
T_s = duration of sample collection in min
T_g = gross counting time
T_b = background counting time
R_n = net count rate in cpm
R_b = background count rate in cpm
C = concentration of radioactive material in the air in $\mu Ci/cm^3$

N = 5 days of sampling minimum per week
E = 1.0 37mm 0.8 μm MCE Filters
F = 2.5×10^3 cm^3/min (or ml/min)
2.5 liters per minute x 1000 ml/l = 2500 ml/min
K = 699300
0.315 count/disintegration x 2.22 x 106 dis/μCi = 699300 cpm/μCi
T_s = 480 min
Based on a minimum of 8 hours per day
T_g = 30 min
T_b = 600 min

Rb = 0.58 cpm, based on 3000 min background count on 9/16 – 9/20/02

$$MDC = \frac{2.71}{(5)\,(1.0)\,(2500)\,(699300)\,(480)\,(30)} + 3.29\,\frac{\sqrt{(0.58)\left[\frac{1}{(600)}+\right]\frac{1}{(30)}}}{(2.24)\,(1.0)\,(2500)\,(699300)\,(480)\,(30)}$$

$= 2.98 \times 10^{-14}$ μCi/ml (gross alpha weekly MDC)
$= 5.96 \times 10^{-15}$ μCi/ml (gross alpha ÷ 5, for Th-232)

MINIMUM DETECTABLE CONCENTRATION CALCULATION
Sensidyne TFIA High Volume Air Samples analyzed on Ludlum 43-10 Alpha Counter

$$MDC = \frac{2.71}{n\,E\,F\,K\,T_g\,T_g} \quad \frac{3.29\,\sqrt{Rb}\left[\frac{1}{Tb}+\frac{1}{Tb}\right]}{n^{1/2}\,E\,F\,K\,T_s\,cf}$$

NUREG 1400 Air Sampling in the Workplace Appendix A (eq A.17)

n = number of sampling intervals
E = fractional filter efficiency
F = airlow rate through the sampler in cm^3/min
K = counting efficiency in cpm/μCi
T_s = duration of sample collection in min
T_g = gross counting time
T_b = background counting time
R_n = net count rate in cpm
R_b = background count rate in cpm
Cf = count vs. sample conversion
(this is not part of NUREG 1400, however, analysis volume must be taken into account)

n = 5 days of sampling minimum per week
E = 0.7 (referred to as filter retention factor on air sampling form)
F = 1.13×10^6 cm^3/min (or ml/min)
40 ft^3/min x 28.316 liters/ft^3 x 1000 ml/l = 1.13×10^6 ml/min
K = 699300
0.315 count/disintegration x 2.22 x 106 dis/μCi = 699300 cpm/μCi
T_s = 480 min
Based on a minimum of 8 hours per day
T_g = 30 min
T_b = 600 min
Cf = 0.035
8" x 10" original filter size = 80 $inches^2$
0.3 inch border is covered by sampler plate and not sampled = 10.8 $inches^2$
filter cutout = $\pi r^2 = (0.875")^2\,(3.14) = 2.41$ $inches^2$
actual sample area = 80 $inches^2$ – 10.8 $inches^2$ = 69.2 $inches^2$
sample analyzed vs. sample collected ration = 2.41/69.2 = 0.035
r_b = 0.58 cpm, based on 3000 min background count on 9/16 – 9/20/02

$$MDC = \frac{2.71}{(5)\,(0.7)\,(1.13E6)\,(699300)\,(0.035)\,(480)\,(30)} + \frac{3.29\,\sqrt{(0.58)}\left[\frac{1}{(600)}+\right]\frac{1}{(30)}}{(2.24)\,(0.7)\,(1.13E6)\,(699300)\,(0.035)(480)\,(30)}$$

$= 2.69 \times 10^{-15}$ μCi/ml (gross alpha weekly MDC)
$= 5.39 \times 10^{-16}$ μCi/ml (gross alpha + 5, for Th-232)

164-166 EAST GRAND AVE
CHICAGO, IL 60611

Title: USEPA Health and Safety Plan

Revision Number: 1

Date: October 29, 2012

Replaces: New

TABLE OF CONTENTS

EMERGENCY PHONE NUMBERS

IN THE EVENT OF AN EMERGENCY DIAL 911

AMBULANCE SERVICE	911
FIRE DEPARTMENT	911
EMERGENCY RESCUE SERVICE	911
POLICE DEPARTMENT	911
NATIONAL RESPONSE CENTER	1-800-424-8802
POISON CONTROL CENTER	1-800-732-2200
NORTHWESTERN MEMORIAL HOSPITAL	(312) 908-2000
PROJECT COORDINATOR (Steve Kornder)	(847) 279-2448
	(847) 343-6007 cell
ILLINOIS EMERGENCY MANAGEMENT AGENCY	(217) 782-7860
Dept of Nuclear Safety(IEMA) Emergency Number	(217) 785-0600 [1]
USEPA REGION 5 24-HOUR EMERGENCY NUMBER	**(312) 353-2318**

[1] Primary notification should be made to USEPA Region 5. The IEMA Department of Nuclear Safety emergency number (217-785-6000) can be used as a secondary notification number.

Hospital Location and Directions

Northwestern Memorial Hospital
250 E. Superior Street
Chicago, IL 60611

Directions:

1.	**Start at corner of E GRAND AVE, CHICAGO and N ST CLAIR ST**	
2.	**Go north on N ST CLAIR ST**	**go 0.27 mi**
3.	**Turn on E SUPERIOR ST**	**go 423 ft**
4.	**Arrive at 250 E SUPERIOR ST, CHICAGO, on the left**	

EMERGENCY PLAN

In the event excavation within the potentially impacted area (site specific) is required on an emergency basis, the following shall be incorporated to the extent possible, and all personnel working in the potentially impacted areas shall be given the opportunity to read this section of the Health and Safety Plan (HASP). The remainder of the attached HASP will be implemented as conditions allow.

A. PROTECT WORKERS POTENTIALLY EXPOSED TO IMPACTED SOIL

1. Notify workers that levels of radiation above background levels may be present in excavated soil.
2. Avoid ingesting soil.
   Avoid inhaling dust from contaminated areas.
   Minimize contact with the soil to the extent possible.
   Wear protective coveralls or disposable coveralls to facilitate cleanup of workers.
3. Screen excavation for gamma radiation (NaI detector).

B. AVOID SPREAD OF CONTAMINATION

1. Limit erosion transport of excavated soil through use of hay bales, sand bags, temporary berm materials to minimize uncontrolled runoff.
2. Cover any excavated soil piles until screened for potential contamination.
3. Screen soil prior to transport away from project site using NaI gamma detector.
4. Do not remove equipment which has been in contact with potential contamination until it has been checked and released.

C. MINIMIZE POTENTIAL PUBLIC CONTACT.

1. Limit access to excavated soil using barricades, temporary fencing, jersey barriers.
2. Cover excavated piles to minimize fugitive dust. Wet dusty excavations.
3. Control, to the extent possible, off-site tracking by vehicles, potentially contaminated boots or clothing by workers.

D. MONITOR CONTAMINATION

1. To the extent practicable, provide gamma radiation screening of the exposed soils in the excavation (NaI detector).
2. When possible, provide high volume air samplers immediately adjacent to potential or known exposed contaminated soil, to monitor for fugitive emissions (dust, radon gas).
3. Survey ground surface/pavement surface around potential or known contamination locations for elevated gamma radiation (NaI detector).

E. DISPOSAL

1. Any excavated material should be disposed as required by law.

F. NOTIFY AUTHORITIES

1. Notify agencies identified on the enclosed emergency notification list.

Notification should include, as a minimum, the following

1. Location of Excavation
2. Potential Contact with Thorium Containing Soil
3. Field surveys and sampling measured a maximum reading of _____ cpm (if readings have been taken) in soils remaining, although higher concentrations may be present.

USEPA HEALTH AND SAFETY PLAN

1.0 SCOPE OF PLAN

The following Health and Safety Plan (HASP) will be utilized and modified as necessary in order to minimize and prevent exposures to hazardous substances and conditions related to all excavation and restoration activities at the Site. All personnel assigned to this project will be required to review thoroughly the contents of the HASP and to strictly adhere to the policies and procedures listed herein. This HASP is for use only by AECOM as the remediation manager and by their designated contractors and consultants, and approved Site visitors. USEPA, and other agencies, are not considered visitors and will be required to conform to their own Health and Safety Plans.

This plan meets the requirements of OSHA 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response, and applicable subparts of OSHA 29 CFR 1926, 1910 and 10 CFR. Visitors will be required to review the health and safety plan and read and sign the visitor information sheet (Figure 1.1).

The following Standard Operating Procedures (SOPs) have been developed for this project and should be followed accordingly:

(1) SOP-210 Gamma Radiological Surveys
(2) SOP-212 Air Monitoring Procedure

FIGURE 1.1
VISITOR INFORMATION SHEET

NOTICE TO VISITOR: ALL VISITORS MUST BE ESCORTED AT ALL TIMES WHILE ON THIS SITE.

CAUTON. Radioactive materials may be present on this site. Radioactive materials may be found throughout the site. Grounds, and equipment have low levels of contamination.

CONTROLLED AREAS: Do not enter areas with these signs unless you have an escort or health physics has given specific approval and you understand access limitations.

You must wear protective clothing in controlled areas. Health physics will provide you with instructions.

You must wear a personal radiation dosimeter if you enter an area which is controlled.

No smoking, eating, drinking or chewing in controlled areas.
NO EXCEPTIONS.

.Notify Health Physics if you do not understand these instructions.

Signature _____ Date _____

2.0 SAFETY MANAGEMENT

The following safety management structure, Figure 2.1, will be utilized for the implementation, administration, and monitoring of the HASP.

2.1 Health and Safety Coordinator

The Health and Safety Coordinator (HSC) shall assume overall responsibility for the HASP. The HSC or designee shall monitor and maintain quality assurance of the HASP until project completion. Principal duties of the HSC include:

- Review project background data,
- Approve all HASP modifications,
- Administer and enforce the HASP,
- Evaluate the adequacy of personal protective equipment (PPE) to be used by Site personnel,
- Conduct required on-site training except tailgate safety meetings that will be conducted by the Field Team Leader,
- Brief visitors on work Site conditions, and
- Administer personnel and perform ambient air monitoring procedures.

The HSC or designee has the authority to stop work in the event conditions develop which pose an unreasonable risk to Site personnel or persons in the vicinity.

PROJECT MANAGEMENT ORGANIZATION CHART

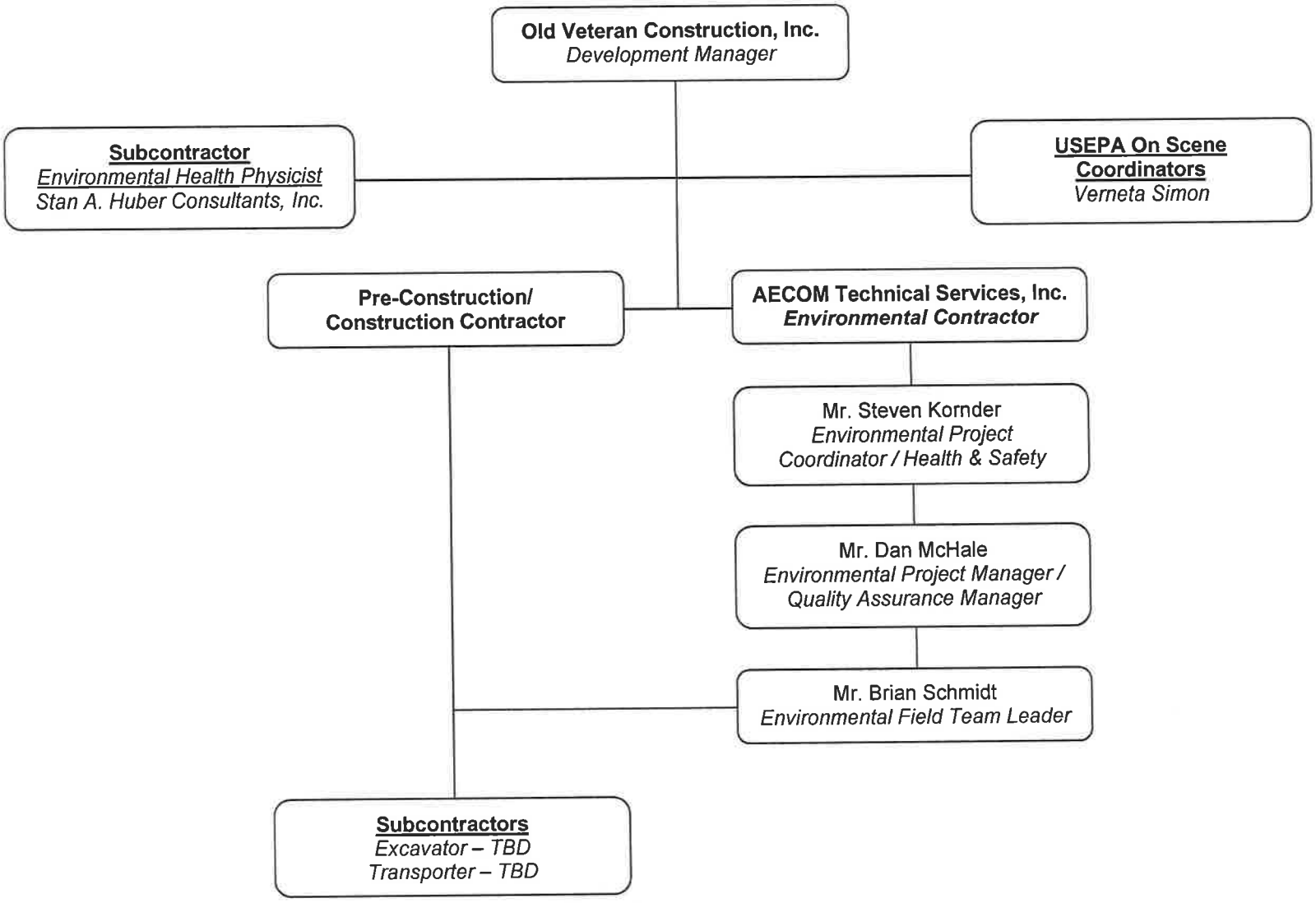


Figure 2.1

3.0 PERSONNEL RESPONSIBILITIES

The HSC or designee will administer and supervise the HASP at the work-site level. He will monitor all operations and will be the primary on-site contact for health and safety issues, and will have full authority to stop operations if conditions are judged to be hazardous to on-site personnel or the public.

The HSC will brief all Site personnel on the contents of the HASP. Personnel will be required to review the HASP, and have the opportunity to ask questions about the planned work or hazards. The Field Team Leader will conduct tailgate safety meetings to familiarize the Site personnel with Site conditions, boundaries, and physical hazards. Site personnel will conduct their assigned tasks in accordance with the HASP at all times. As necessary, the Field Team Leader will conduct radiation training and provide briefings on radiation issues that arise during construction. These activities will take place as part of the tailgate safety meetings, or during special meetings to address more immediate concerns, dependent on the issues being addressed.

If at any time Site personnel observe unsafe conditions, faulty equipment or other conditions which could jeopardize personnel health and safety, they are required to immediately report their observations to the HSC or Field Team Leader.

Work zones will be established at the Site. These zones include clean/support zones, decontamination zones, and exclusion zones. Although the clean/support zones are anticipated to remain fixed, other zones will move about the Site as excavation work progresses.

4.0 HAZARD ASSESSMENT

The following represents potential hazards associated with this project.

4.1 Principal Contaminants (Known or Suspected)

Radioactive Contamination:

- Thorium: the entire thorium (Th-232) decay chain
- Uranium: the entire uranium (U-238) decay chain
- Actinium: the entire uranium (U-235) decay chain
- Radium: Ra-226 and Ra-228
- Radon: Rn-220 and Rn-222

The known total radium concentration present in the soil potentially exceeds 100 pCi/g for some locations within the project site. The following primary routes of entry to the body will be considered:

Route	Entry Made Via
Inhalation	Airborne dust containing heavy metal radionuclides and radon.
Ingestion	Airborne dust containing heavy metal radionuclides/contaminants. Improper or poor personal hygiene practices.
Eye and Skin	Direct contact with contaminants. Improper or poor personal hygiene practices. Airborne dust containing heavy metal/radionuclide contaminant. Cuts and abrasions.
Direct Exposure	Penetrating gamma radiation in air and soil. Exposure to X-rays.
Chemical Contamination	Polynuclear Aromatic Hydrocarbons (PAHs)

PAH contamination is present in the urban fill materials on site. These materials include coal cinders, ash and fire debris. Typical PAH concentrations are in the low part per million range.

The use of personal protective equipment, proper procedures and dust suppression activities will minimize any hazard to site personnel from either the elevated radioactivity or PAH contamination. Specific safety procedures will be covered in subsequent sections of this Site Safety Plan.

Route	Entry Made Via
Inhalation	Airborne dust
Ingestion	Airborne dust Improper or poor personal hygiene
Skin and Eye	Direct contact with contaminated soil Improper or poor personal hygiene Airborne dust Cuts and abrasions

4.2 Physical Hazards

Before field activities begin, the HSC will conduct a Site reconnaissance to identify any real or potential hazards created from Site activities. Physical hazards inherent to construction activities and power-operated equipment may exist.

4.2.1 Heat Stress

Field activities in hot weather create a potential for heat stress. The warning symptoms of heat stress include fatigue; loss of strength; reduced accuracy, comprehension and retention; and reduced alertness and mental capacity. To prevent heat stress, personnel shall receive adequate water supplies and electrolyte replacement fluids, and maintain scheduled work/rest periods.

The Field Team Leader or designee shall continuously visually monitor personnel for signs of heat stress. In addition, field personnel will be instructed to observe for symptoms of heat stress and methods on how to control it. One or more of the following control measures can be used to help control heat stress.

- Provision of adequate liquids to replace lost body fluids. Employees must replace body fluids lost from sweating. Employees must be encouraged to drink more than the amount required to satisfy thirst, 12 to 16 ounces every half-hour is recommended. Thirst satisfaction is not an accurate indicator of adequate salt and fluid replacement. Replacement fluids can be commercial mixes such as Gatorade.

- Establishment of a work regimen that will provide adequate rest periods for cooling down. This may require additional shifts of workers.

- Breaks should be taken in a cool and shaded rest area (77 degrees is best).

- Employees shall remove impermeable protective garments during rest periods.

- Employees shall not be assigned other tasks during rest periods.

- All employees shall be informed of the importance of adequate rest, acclimation, and proper diet in the prevention of heat stress.

4.2.2 Cold Stress

Field activities are anticipated during cold weather during a period when temperatures average below freezing. The following guidelines will be followed.

Persons working outdoors in temperatures of 40 degrees and below may suffer from cold exposure. During prolonged outdoor periods with inadequate clothing, effects of cold exposure may even occur at temperatures well above freezing. Cold exposure may cause severe injury by freezing exposed body surfaces (frostbite) or result in profound generalized cooling, possibly causing death. Areas of the body which have high surface area-to-volume ratios such as fingers, toes and ears are the most susceptible to frostbite.

Two factors influence the development of a cold injury: ambient temperature and the velocity of the wind. Wind chill is used to describe the chilling effect of moving air in combination with low temperature. For instance, 10° F with a wind of 15 miles per hour (mph) is equivalent in chilling effect to still air at -18°F.

As a general rule, the greatest incremental increase in wind chill occurs when a wind of 5 mph increases to 10 mph. Additionally, water conducts heat 240 times faster than air. Thus, the body cools suddenly when external chemical-protective equipment is removed if the clothing underneath is perspiration-soaked.

Local injury resulting from cold is included in the generic term "frostbite". There are several degrees of damage. Frostbite of the extremities can be categorized into:

- Frost nip or incipient frostbite: Characterized by sudden blanching or whitening of skin.

- Superficial frostbite: Skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient.

- Deep frostbite: Tissues are cold, pale, and solid; extremely serious injury.

Prevention of frostbite is vital. Keep the extremities warm. Wear insulated clothing as part of one's protective gear during extremely cold conditions. Check for symptoms of frostbite at every break. The onset is painless and gradual - you might not know you have been injured until it is too late.

To administer first aid for frostbite, bring the victim indoors and rewarm the areas quickly in water 95° to 100°F. Give individual a warm drink - not coffee, tea, or alcohol. The victim should not smoke. Keep the frozen parts in warm water or covered with warm clothes for 30 minutes, even though the tissue will be very painful as it thaws; then elevate the injured area and protect it from injury. Do not allow blisters to be broken. Use sterile, soft, dry material to cover the injured areas. Keep victim warm and get immediate medical care.

4.2.3 Electrical Hazards

Overhead power lines, downed electrical wires, buried cables and improper use of electrical extension cords can pose a danger of shock or electrocution. All Site personnel should immediately report to the Field Team Leader any condition that could result in a potential electrical hazard.

The Field Team Leader will notify Site personnel during the safety meetings of the locations of known underground cables and utilities.

4.2.4 Noise Hazard

Operation of equipment may present a noise hazard to workers. Site personnel will utilize hearing protection when noise levels are determined to be in excess of 29 CFR 1910.95 requirements. Noise monitoring will be performed by the HSC as needed.

4.2.5 Overt Chemical Exposure

Typical response procedures include:

SKIN CONTACT:
Use copious amounts of soap and water. Wash/rinse affected area thoroughly, then provide appropriate medical attention. Eye wash will be provided on-site at the work zone and support zone as appropriate. If affected, eyes should be continuously flushed for a minimum of 15 minutes.

INHALATION:
Move to fresh air and transport to hospital. Decontaminate as other actions permit.

INGESTION:
Transport to emergency medical facility. Decontaminate as permitted by other requirements.

PUNCTURE WOUND OR LACERATIONS:
Transport to emergency medical facility. Field Team Leader will provide chemical safety information to medical personnel as requested. Decontaminate as permitted by other requirements.

4.2.6 Adverse Weather Conditions

In the event of adverse weather conditions, the Field Team Leader will determine if work can continue without endangering the health and safety of field workers. Some items to be considered before determining if work should continue are:

- Potential for heat stress and heat-related injuries.
- Potential for cold stress and cold-related injuries.
- Treacherous weather-related working conditions.
- Limited visibility.
- Potential for electrical storms or high winds.

4.3 Medical Evaluation and Surveillance Program

All field project personnel shall receive a medical evaluation in accordance with 29 CFR 1910.120. Personnel who receive a medical evaluation will be notified by the medical contractor as to the outcome of their evaluation. This will be in the form of a confidential report addressed to the individual and will contain a breakdown of the clinical findings. In addition, it will indicate any areas of concern which would justify further medical consultation by the individual's personal physician. In the event that the areas of concern are of a severe nature, a follow-up notification will be made to the individual by the medical consultant to answer any questions the employee may have.

4.3.1 Dosimetry/Personnel Monitoring

Project personnel involved with remedial activities within an exclusion zone will participate in a dosimetry program administered by the HSC. (The dosimetry program shall comply with 32 IAC 340[1], i.e., dosimeters will be processed by a dosimetry processor accredited by the National Voluntary Laboratory Accreditation Program.) The HSC shall maintain records of all radiation exposures incurred by field personnel including all contractors. These records will be maintained in an up-to-date manner to comply with the requirements of 32 IAC 340.4010. The HSC shall review the results of personal exposure monitoring to determine compliance with exposure limit requirements.

4.3.2 Requirement for Dosimetry

Personal dosimetry is required for anyone who enters a radiologically controlled area in which he/she may receive in one calendar year a dose in excess of 10% of the limits in 32 IAC 340. Any person who works in a radiation area will be required to have a personal dosimeter. As a matter of policy, individuals will be required to use a dosimeter (either self-reading type, film badge, Thermoluminescence Detector (TLD) or Optically Stimulated Luminescence Dosimeter (OSL)) whenever they enter the Exclusion Zone.

4.3.3 Bioassay

Bioassay is the determination of the types and amounts of radioactive materials, which are inside the body. By analyzing the rate of deposition, the rate of excretion, and any other available information regarding placement in the body, internal exposures from radioactive materials can be estimated.

Procedures for bioassay will be consistent with the previous Lindsay Light Health and Safety Plan. Bioassays are not anticipated to be required for the excavation and removal activities proposed, based on levels documented as present.

The decision to use bioassay will be made by the Health and Safety Coordinator. In the event that a worker has an excessive intake or the potential to receive greater than 10% of the Annual Limit on Intake (ALI) , bioassay shall be ordered. Data from Lapel Air Samplers shall be used as a factor in determining whether or not bioassay is warranted. If workers are found to have been present in locations where airborne radioactivity concentrations are found to be greater than 30% of the Derived Air Concentration, bioassay will be considered.

[1] The IEMS regulations are usually more restrictive than US Nuclear Regulatory Commission (NRC) regulations. However, if there is a conflict between IEMS and NRC regulations, the NRC regulations will be used to determine compliance.

4.3.4 Emergency Medical Treatment

Emergency first aid should be administered on-site as appropriate. The individual should be decontaminated if possible, depending on the severity of the injury, and transported to the nearest medical facility, if needed. Treatment of the injury is of primary concern and decontamination a secondary concern. Levels of radioactive contamination at the Site could be acutely hazardous if decontamination is not undertaken during an emergency situation. The Field Team Leader will complete the appropriate incident report, if warranted. See Section 4.4, Accident and Incident Reporting.

An emergency first-aid station will be established and will include a first-aid kit for onsite emergency first aid.

Provisions for emergency medical treatment shall be integrated with the following guidelines:

- At least one individual qualified to render first aid and Cardiopulmonary Resuscitation (CPR) will be assigned to each shift.
- At least one individual trained in radiation emergency response will be assigned to each shift
- Emergency first aid stations in the immediate work vicinity.
- Conspicuously posted phone numbers and procedures for contacting ambulance services, fire department, police, and medical facilities.
- Maps and directions to medical facilities.
- Conspicuously posted evacuation routes and gathering area locations shall be posted around the Site.

4.4 Accident and Incident Reporting

All accidents, injuries, or incidents will be reported to the HSC. This accident/incident will be reported as soon as possible to the employee's supervisor. An Accident/Incident Form will be completed by the Field Team Leader, and a copy will be forwarded to the AECOM Project Manager. A copy of the form is shown as Figure 4.1.

FIGURE 4.1
ACCIDENT/EXPOSURE INVESTIGATION REPORT

COMPANY			DATE
INVESTIGATION TEAM			
EMPLOYEE'S NAME & ID			
SEX	AGE	JOB DESCRIPTION	
DEPARTMENT & LOCATION			
ACCIDENT DATE & TIME			
DATE & TIME ACCIDENT REPORTED TO SUPERVISOR			
NATURE OF INCIDENT			
NATURE OF INJURY			
REFERRED TO MEDICAL FACILITY/DOCTOR ☐ YES ☐ NO			
EMPLOYEE RETURNED TO WORK ☐ YES DATE/TIME _____ ☐ NO			
☐ INJURED EMPLOYEE INTERVIEW/STATEMENT - ATTACHED			
WITNESSES			
☐ WITNESSES INTERVIEWS/STATEMENTS ATTACHED			
☐ PHOTOGRAPHS OF SITE - ATTACHED			
☐ DIAGRAMS OF SITE - ATTACHED			
EQUIPMENT RECORDS - ATTACHED - REVIEWED	☐ YES	☐ NO	
ACCIDENT/EXPOSURE INCIDENT DESCRIPTION			

FIGURE 4.1
ACCIDENT/EXPOSURE INVESTIGATION REPORT

ACCIDENT DESCRIPTION		
DATE & TIME	LOCATION	
EMPLOYEES INVOLVED		
PREVENTIVE ACTION RECOMMENDATIONS		
CORRECTIVE ACTIONS COMPLETED	MANAGER RESPONSIBLE	DATE COMPLETED

EMPLOYEE LOST TIME - TEMPORARY HELP - CLEANUP - REPAIR - DISCUSSION			
ACCIDENT COST ANALYSIS	INVESTIGATION	COMPLIANCE	TOTAL COST
MEDICAL			
PRODUCTION LOSS			

REPORT PREPARED BY	DATE COMPLETED	
SAFETY COMMITTEE REVIEW	☐ YES	☐ NO
CORRECTIVE ACTION	DATE STARTED	
SAFETY COMMUNICATION NOTICE PREPARED	DATE	
SAFETY DIRECTOR SIGNATURE		

FIGURE 4.1
ACCIDENT/EXPOSURE INVESTIGATION REPORT

ACCIDENT DESCRIPTION	
DATE & TIME	LOCATION
EMPLOYEES INVOLVED	
EMPLOYEE INTERVIEW/STATEMENT - INJURED EMPLOYEE - WITNESS	
EMPLOYEE NAME	
INTERVIEWED BY	

ACCIDENT DIAGRAM/PHOTOGRAPHS

5.0 TRAINING

All Site personnel potentially in contact with impacted soil or who are involved in the excavation and/or loading for transport of radiologically-impacted soil shall be trained and certified in accordance with 29 CFR 1910.120.

5.1 Project- and Site-Specific Training

Prior to project start-up, all assigned personnel shall receive an initial project- and site-specific training session. This training shall include, but not be limited to, the following areas:

- Review of the Health and Safety Plan;
- Review of general radiation principles and compounds;
- Review of applicable radiological chemical and physical hazards;
- PPE levels to be used by Site personnel;
- Site security control;
- Emergency response and evacuation procedures;
- Project communication;
- Required decontamination procedures;
- Prohibited on-site activities;
- Instructions to workers in accordance with 10 CFR 19.12; and
- U.S. NRC Regulatory Guide 8.13 and Declared Pregnant Woman Policies (Females).

5.2 Visitor Orientation

All non-essential personnel and visitors who plan to enter the exclusion zone will be briefed on the HASP requirements and 10 CFR 19.12 requirements prior to entry with a trained Site escort. In addition, female visitors will be instructed regarding U.S. NRC Regulatory Guide 8.13 and Declared Pregnant Woman Policies.

5.3 Safety Tailgate Meetings

Before the start of the work week, on Monday morning, the Field Team Leader will assemble the Site personnel for a brief safety meeting. Additional meetings will be conducted throughout the week, as needed, to address safety concerns and precautions. The purpose of these meetings will be to discuss project status, problem areas, conditions, safety concerns, PPE levels and to reiterate HASP requirements. The Field Team Leader will complete a Safety Meeting Report (Figure 5.1) to indicate the contents of the meeting and the attendees.

5.4 First Aid

At least one (1) individual, trained and qualified to administer first aid and CPR in accordance with American Red Cross requirements, who is also trained in radiological response, will be present at the Site.

5.5 Safe Work Permit

Site workers in special work conditions such as confined space, hot work, trenching, or other physical hazards, must be skilled at such work and trained to recognize these as special work conditions. Confined space is defined by OSHA 1910.146. Section 13 of this HASP contains further information on the confined space program to be followed.

Figure 5.2 shows the Safe Work Permit to be completed by the HSC and signed by workers for special work conditions.

Figure 5.3 show the issues which will be addressed in the event soil is encountered which exhibits low level contamination. The potential low level contamination includes the presence of possible residual petroleum products from an existing or former underground storage tank or other source of fuel or polynuclear aromatics hydrocarbons (PAHs) contamination, such as tar, cinders, or coal ash.

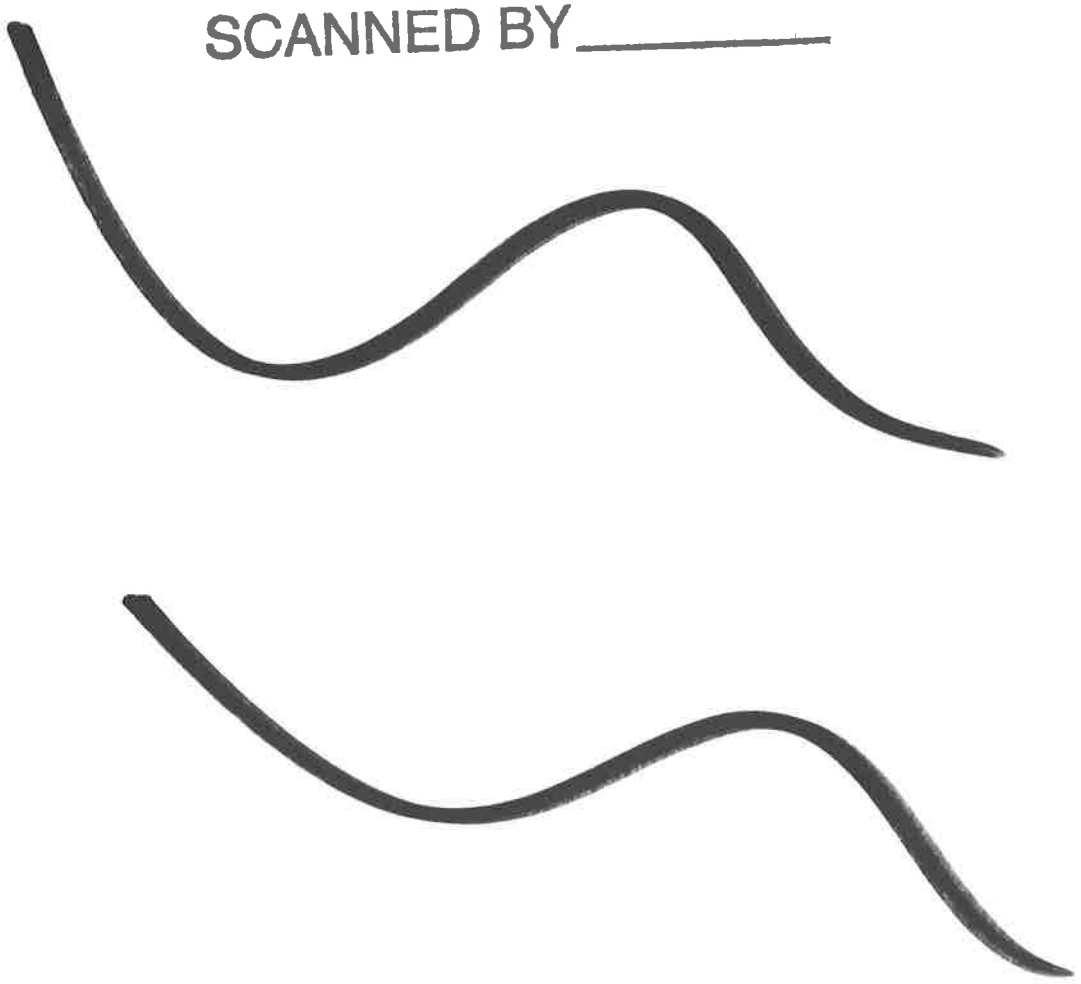


FIGURE 5.1
SAFETY MEETING REPORT (Page 1 of 2)

DATE		DURATION OF MEETING	
		FROM: ☐ A.M. ☐ P.M.	TO: ☐ A.M. ☐ P.M.
NUMBER PRESENT	NUMBER ABSENT	MEETING CONDUCTED BY	DID MEETING INCLUDE REQUIRED TRAINING? ☐ YES (DESCRIBE BELOW) ☐ NO

HEALTH AND SAFETY COORDINATOR'S PRESENTATION	DISCUSSION OF SAFE/UNSAFE WORK PRACTICES, MATERIALS, PRECAUTIONS, HAZARDS, EQUIPMENT FAMILIARIZATION, ETC.
SITE WORKER FEEDBACK	COMMENTS, QUESTIONS, COMPLAINTS, ETC.
HEALTH AND SAFETY COORDINATOR'S CORRECTIVE ACTION PLAN	KNOWN PLANS FOR CORRECTION, PARTS ON ORDER, ITEMS TO BE DISCUSSED WITH DEPART. HEAD, AND CORRECTION OF ITEMS PREVIOUSLY SUBMITTED
PROJECT MANAGER'S COMMENTS	RESOLUTION OF QUESTIONS, ITEMS OR ISSUES RAISED IN MEETING OR WITH SUPERVISOR

HEALTH AND SAFETY COORDINATOR	PROJECT MANAGER
FIELD TEAM LEADER	HAVE SITE WORKERS ATTENDING SIGN ON REVERSE SIDE. FORWARD A COPY TO THE PROJECT COORDINATOR

FIGURE 5.1
SAFETY MEETING REPORT (Page 2 OF 2)

TO BE SIGNED BY ALL SITE WORKERS ATTENDING THE MEETING			
I HAVE RECEIVED AND UNDERSTAND THE INFORMATION AND/OR TRAINING INDICATED ON THE REVERSE SIDE.			
SIGNATURE	**DATE**	**SIGNATURE**	**DATE**

LIST ALL SITE WORKERS ABSENT FROM THE MEETING	

FIGURE 5.2
SAFE WORK PERMIT (Page 1 of 2)

COMPLETED PERMIT MUST BE POSTED AT THE ENTRY OR WORK SITE.

ISSUED BY	DATE	TIME (FROM) ☐ A.M. ☐ P.M.	TIME (TO) ☐ A.M. ☐ P.M.
ACCEPTED BY		RESPONSIBILITY TRANSFERRED TO (NAME)	
LIST ALL WORKS (ON BACK) OR ATTACH ROSTER			

SECTION 1 — GENERAL AREA WORK PERMIT

1. WORK LIMITED TO THE FOLLOWING: (DESCRIPTION AND AREA/EQUIPMENT)

2. SAFETY EQUIPMENT (OTHER THAN AREA REQUIREMENTS) ☐ NONE

☐ RAIN SUIT ☐ GLOVES ☐ FACE SHIELD ☐ GROUND FAULT CIRCUIT INT. ☐ AIR PACK (SCBA) ☐ FIRE RESISTANT CLOTHING
☐ CHEMICAL SUIT ☐ HEARING PROTECTION ☐ HOOD ☐ BARRICADES/WARNING SIGN ☐ SUPPLIED AIR ☐ LONG SLEEVES
☐ RUBBER BOOTS ☐ CHEMICAL GOGGLES ☐ FALL RESTRAINT DEVICE ☐ COMMUNICATIONS EQPT (EST) ☐ RESPIRATOR ☐ OTHER

3. THE PERSON RECEIVING THE PERMIT VERIFIES THAT ALL WORKERS:

A. HAVE BEEN THROUGH THE SAFETY ORIENTATION	☐ YES	E. KNOW THE LOCATION OF THE PHONE OR INTERCOM	☐ YES
B. UNDERSTAND APPLICABLE HAZCOM AND RADIATION REQUIREMENTS	☐ YES	F. KNOW THE PROCEDURES FOR SAFE JOB COMPLETION	☐ YES
C. HAVE DISCUSSED HAZARDS OF THE JOB AND AREA	☐ YES	G. HAVE INSPECTED ALL TOOLS/EQUIPMENT	☐ YES
D. KNOW THE LOCATION/USE OF SAFETY EQUIPMENT	☐ YES	H. UNDERSTAND THE CLEAN UP REQUIREMENTS	☐ YES

PERMIT RECEIVER INITIALS _____

4. POTENTIALLY AFFECTED AREA PERSONNEL AND WORKERS NOTIFIED OF WORK TO BE DONE ☐ YES ☐ N/A

5. THE FOLLOWING RESPONSIBILITIES HAVE BEEN COMMUNICATED TO THE PERSON RECEIVING THIS PERMIT:

☐ CONDITIONS FOR WORK STOPPAGE	☐ PERFORMING THE WORK SAFELY	☐ COMPLETION OF SECTION 6 AND PERMIT RETURN
☐ CREW ACCOUNTABILITY	☐ REPORTING CHANGES THAT AFFECT JOB SAFETY	

SECTION 2 — AIR TESTS

PRIOR TO ENTRY OR HOT WORK ☐ DOES NOT APPLY

TEST IN ORDER INDICATED

1. OXYGEN METER TEST PERFORMED	☐ YES ☐ N/A	READING	%O_2	RANGE 19.5-23.5% O_2	TESTED BY	LOCATION OF TEST	TIME	☐ AM ☐ PM
2. COMBUSTIBLE GASES AND VAPORS TEST	☐ YES ☐ N/A	READING	%LEL	MAXIMUM 10% LEL	TESTED BY	LOCATION OF TEST	TIME	☐ AM ☐ PM
3. TESTS FOR TOXICS	☐ YES ☐ N/A	READING	☐ PPM ☐ MA/M^3	PEL/TLV ☐ PPM ☐ MA/M^3	TESTED BY	LOCATION OF TEST	TIME	☐ AM ☐ PM

SECTION 3 — HOT WORK

☐ DOES NOT APPLY

	YES	N/A		YES	N/A
1. FIRE EXTINGUISHER (TYPE) _____ IS IT FULL?			8. GROUND LEAD ATTACHED TO WORK		
2. SURVEY AREA FOR COMBUSTIONS AND OPENINGS, HOSES, TRENCHES, ETC.			9. PREVENTION OF HEAT EXPOSURE TO GASKET, SEALS, LINERS		
3. COMBUSTIBLE MATERIALS REMOVED OR PROTECTED			10. OTHER WORK IN AREA WHICH SHOULD BE STOPPED		
4. HEAT/SPARK CONTROL - TARPS, COVERS, WATER, ETC.			11. MATERIAL PRESENT WHICH EMITS VAPOR WHEN HEATED		
5. PRECAUTION TAKEN FOR HIDDEN COMBUSTIBLES			12. RADIANT HEAT TRANSFER CONSIDERED		
6. PURGE GAS USED. TYPE _____			13. EQUIPMENT OPERATING OR CONTAINS ORIGINAL CONTENTS		
7. ADJACENT AREAS SAFE/SEWERS PROTECTED			14. DUCTS OR CONVEYORS PLUGGES OR PROTECTED		

SECTION 4 — CONFINED SPACE

☐ DOES NOT APPLY

	YES	NO	N/A		YES	NO	N/A
1. CONFINED SPACE ENTRY REQUIRED?				5. HAVE AUTHORIZED ENTRANTS SIGNED OPPOSITE SIDE OF THIS FORM?			
2. SPACE TO BE ENTERED _____				6. HAVE DESIGNATED ATTENDANTS SIGNED OPPOSITE SIDE OF THIS FORM?			
3. PURPOSE OF ENTRY _____				7. HAVE ALL NECESSARY HAZARD CONTROL MEASURES BEEN TAKEN?			
4. IS SPACE A PERMIT-ENTRY SPACE? IF YES, COMPLETE OPPOSITE COLUMN				8. HAS ALL REQUIRED EQUIPMENT BEEN PROVIDED?			

SECTION 5 — TRENCHING/EXCAVATION

☐ DOES NOT APPLY

	YES	NO	N/A		YES	NO	N/A
1. HAS THE AREA BEEN INSPECTED FOR UNDERGROUND POWER LINES OR PRODUCT LINES?				4. HAVE PRECAUTIONS BEEN TAKEN IF THE TRENCH/EXCAVATION DEVELOPS INTO A CONFINED SPACE?			
2. DOES THE TRENCH REQUIRE SHORING/BRACING/SUPPORT?				5. HAVE OVERHEAD POWER/PRODUCT LINES BEEN REMOVED OR IDENTIFIED?			
3. HAS THE SOIL BEEN EVALUATED FOR STABILITY?				6. WILL LEAKING WATER OR RAIN WATER AFFECT THE STABILITY OF THE TRENCH/EXCAVATION?			

SAFE WORK PERMIT (Page 2 of 2)

SECTION 6

QUESTIONS TO BE COMPLETED ON PERMIT EXPIRATION OR JOB COMPLETION.		YES	NO	N/A		YES	NO	N/A
	1. HAS THE JOB BEEN COMPLETED?				5. HAVE SAFETY DEVICES BEEN REINSTALLED?			
WORKER CLOSEOUT SIGNATURE	2. HAS THE AREA BEEN CLEANED OF WORK MATERIAL?				6. HAS HOT WORK AREA BEEN SURVEYED FOR SMOLDERING MATERIALS?			
TIME ☐ AM ☐ PM	3. HAVE MANAGEMENT PERSONNEL BEEN INFORMED JOB IS DONE?				7. SPECIAL PRECAUTIONS, CONCERNS OR REMARKS			
	4. HAVE ALL LOCKS AND/OR TAGS BEEN REMOVED?				COMMENTS:			

OBSERVERS, WATCHERS, RESCUERS

I HAVE BEEN INSTRUCTED AS A CONFINED SPACE ATTENDANT, SAFETY WATCHER OR RESCUER AND UNDERSTAND MY DUTIES.

SIGNATURE	DATE	SIGNATURE	DATE

PERSONS AUTHORIZED TO PERFORM WORK AND/OR TO ENTER CONFINED SPACE

I HAVE BEEN INSTRUCTED IN AND AM AWARE OF THE POSSIBLE HAZARDS AND CONDITIONS I MAY ENCOUNTER IN THIS ENTRY WORK

SIGNATURE	TIME		DATE	SIGNATURE	TIME		DATE
	IN	OUT			IN	OUT	

COMMENTS

AUDIT PURPOSE ONLY

CORRECTIVE ACTIONS

COMPLETED BY

NAME	TITLE	DATE

FIGURE 5.3
SITE SAFETY PLAN
LOW CONTAMINATION OF FUEL,
CHLORINATED PESTICIDES AND PNAs IN SOILS

SUMMARY INFORMATION

DATE: _____ UPDATE: _____

PROJECT NAME: _____ PROJECT NO: _____

LOCATION: _____

SITE CONTACT AND PHONE NUMBER: _____

TYPE OF FACILITY: (active or inactive - describe previous use, previous agency action, soil type, topography, surrounding community)

PLAN PREPARED BY: _____

SITE SAFETY OFFICER: _____ CPR/FIRST AID TRAINED STAFF: _____

REVIEWED BY: _____ DATE: _____

WORK SCOPE/CONSTRUCTION/INVESTIGATION
Task 1 _____
Task 2 _____
Task 3 _____

PROPOSED START DATE: _____

UNUSUAL FEATURES/SITE SECURITY (include site map): _____

UTILITIES: ☐Marked ☐ Scheduled Meet Date _____ Time _____

ANALYTICAL DATA (to be summarized below or attached, if available)
_____
_____

CONFINED SPACE: ☐Yes ☐ No (If yes, describe and address permitting and entry procedures in an attachment.) _____
_____

AIR MONITORING:
Monitoring equipment: HNu meter with 10.2 eV lamp or _____
Action level = 15 PID units in breathing zone for Level C upgrade. Stop work = 50 PID units in breathing zone.
☐ 0_2 meter, ☐ FID, ☐ Detector tubes, ☐ L.E.L. meter, ☐ Other _____

Other action levels: _____

PERSONAL PROTECTION: Level of Protection: ☐ A ☐ B ☐ C ☐ D
Special Requirements _____

COMMUNICATION EQUIPMENT: (Mobile Phone or other phone location and number, etc.)

_____

Scheduled Safety Meetings Interval: (daily, weekly, as needed)

SPECIAL SITE EMERGENCY COMMUNICATION PROCEDURES: (Evacuation signals, routes, spill containment)

HEAT/COLD STRESS CONTROLS:

SPECIAL PHYSICAL HAZARD CONTROLS: Barricades for work area, reflective vests, other, etc.

_____

LOCAL EMERGENCY RESOURCES AND TELEPHONE NUMBERS
Emergency Eye Wash/Shower Location:
Fire Extinguisher: _____
Police: _____
Fire Department: _____
Poison Control: _____
HOSPITAL: _____
Address: _____
Telephone: _____
Directions (supply map): _____
_____

EMERGENCY CONTACTS (name and phone number)
1. Construction Manager Contact: _____
2. Owner Contact: _____
3. Contractor Contact: _____
4. Subcontractor Contact: _____
5. Subcontractor Contact: _____
6. _____
7. _____

PRE-ENTRY SAFETY BRIEFING
I have received and read the _____ Low Contamination Health and Safety Plan. I understand the plan and had the opportunity to ask questions. I understand the information and instructions in the plan. I understand that medicine can complicate the effects from exposure to toxic chemicals. If I am taking any prescription or over the counter medicine or have a current medical condition which may increase my risks, I will advise my supervisor or Site Safety Officer.

Signature	Responsibility	Date
_____	_____	_____
_____	_____	_____
_____	_____	_____

6.0 COMMUNICATIONS

6.1 General Communications

The Field Team Leader will have available at the Site the means for telephone communications, or an equivalent means of communication, for summoning emergency assistance from the fire/ambulance and police departments in the event they are required. The telephone will also act as a direct link to technical personnel for information pertaining to all phases of the project.

6.2 Radio/Telephones

Short-range walkie-talkies or cellular telephones will be made available to designated personnel working at the Site.

6.3 Emergency Warning

In the event of an emergency condition, the Field Team Leader will notify project personnel verbally if all are within immediate hearing and via a bullhorn if the Site area is large. The Field Team Leader will also notify visitors present within the area. Site personnel will immediately proceed to a pre-designated assembly area as designated by the Field Team Leader during the daily safety meeting. Personnel will remain in the designated area until further instructions are received by the Field Team Leader.

All communication equipment will be tested at the beginning of each day to verify operational integrity.

6.4 Hand Signals

Hand signals will be used by field teams in conjunction with the buddy system. Hand signals shall be familiar to the entire field team before operations commence and should be reviewed during site-specific training.

Signal	Meaning
Hand gripping throat	Out of air; can't breathe
Grip partner's wrist	Leave area immediately; no debate
Hands on top of head	Need assistance
Thumbs up	OK; I'm all right; I understand
Thumbs down	No; negative

6.5 Site Security

Only authorized personnel will be permitted on the Site in accordance with the requirements of this HASP. Visitors and other non-essential personnel may enter the work area only upon authorization by the Field Team Leader. This restricted access will ensure that the Field Team Leader can communicate with each person authorized to enter the work area.

7.0 PERSONNEL EXPOSURE AND AIR QUALITY MONITORING

7.1 Air Quality (Dust)

Due to the nature of the principal contaminants associated with the project (radiation and PAHs), dust suppression will be important as a means of minimizing exposure levels and off-site migration of contaminants. A key control measure to minimize exposure levels and off-site migration of contaminants will be a policy of "no visible dust". The Field Team Leader will routinely monitor the project area. Acceptable dust levels (controlling all visible dust) will result in airborne dust levels of less than 1 mg/m^3. The OSHA nuisance dust standard of 15 mg/m^3 is not acceptable at this site, because of contaminants in the dust.

7.2 Airborne Radioactivity Monitoring

Monitoring for airborne radioactivity exposure is as important as monitoring for external radiation exposure. Monitoring for airborne radioactivity exposure requires the following elements:

- Air sampling for radioactive particulates,
- Recordkeeping regarding personnel work locations and time in location,
- Respiratory protective equipment records regarding devices used by workers in airborne radioactivity areas,
- Counting and analyzing air sample filters,
- Calculating air concentrations of radioactive material, and
- Comparing air concentrations to applicable air quality criteria

By closely monitoring these elements, a continuous record of personnel exposure to airborne radioactivity is maintained.

Lapel samplers worn for personal air monitoring shall be utilized for airborne radioactivity monitoring any time a worker enters a radiological exclusion zone. The filters from the lapel samplers shall be analyzed the following day after use for comparison purposes to assess the need for procedural changes. It is expected that naturally occurring radon and thorium daughters will interfere with analyses. Additional evaluation of samples shall be performed when determined necessary based upon elevated results. If sample analysis shows concentrations greater than background levels a follow-up analysis shall be performed. The follow-up analysis shall be performed after four days to allow for the decay of the thoron daughter Pb-212 (10.6 hour half life). The "four day count" should be free from radon daughter interference and will serve as the official measurement of Th-Alpha.

High volume air samplers shall be utilized so that effluent air quality can be gathered on a daily basis. High volume air sampling allows for much shorter collection times than low volume sampling and has equivalent dust loading for needed collection durations. Both high and low volume air samplings require a sufficient volume of air to be collected in order for the Minimum Detectable Activity (MDA) to be below the most restrictive air effluent guidelines. Daily analysis of samples will allow for necessary procedural changes to be made and alert health and safety staff to potential problems on a continuous basis, rather than once per week.

Time decay of interfering nuclides generally refers to radon-222 decay and daughters but may also include thoron decay. The specific times for decay of samples are best addressed in procedures rather than in the health and safety plan.

After filters have been collected and decayed overnight, there will be a morning count of the filter that will serve to identify high gross counts for the previous day. This will alert health and safety staff of a potential problem which they can investigate more promptly. The count, after 4 days decay, will serve to be the official measurement of Th-Alpha.

7.3 Internal Monitoring

Internal monitoring to determine intakes of radioactive material will be performed as needed based upon the results of the air sampling program. Bioassay methods to be considered should include in-vivo, as well as in-vitro, assessments. Routine bioassay of workers is not anticipated based upon the low concentrations of radioactivity in soils to be excavated.

7.4 External Radiation Monitoring

External radiation monitoring of workers will be performed using film badges or thermoluminescent dosimeters. Dosimetry will be provided and processed by a service holding National Voluntary Laboratory Accreditation Program (NVLAP) certification. Pocket dosimeters may also be utilized for visitors and other infrequent personnel requiring access to the Site.

7.5 Radiological Surveys

Radiological surveys will be performed to ensure that radiation levels and contamination levels are within applicable guidelines for workers and the general public. Radiation surveys will be performed using the following instrumentation:

- Ludlum Model 2221 Portable Scaler/Ratemeter with 2"x2" NaI probe (or equivalent). This instrument will be used to conduct surface soil scans. Instrument specific action levels shall be used to determine approximate radiological soil concentrations. Any areas where the count rate is greater than the determined action level shall be considered exclusion zones and marked appropriately.

- Ludlum Model 3 Survey Meter with pancake G-M probe (or equivalent). This instrument will be used to conduct surveillance surveys of both personnel and equipment leaving exclusion zones. The action level for both equipment and personnel surveys is any count rate that exceeds background level. Decontamination procedures detailed in section 9.0 of the HSP will be used when contamination is located.

- Ludlum Model 3 Survey Meter with 1"x1" NaI probe "MicroR meter" (or equivalent) and Eberline Model RO-2 Ion Chamber (or equivalent). These instruments will be used periodically to ensure that dose rates in work areas as well as the Site perimeter are below prescribed levels. The action levels for both on and off site are detailed in Section 7.8 of the HSP in Table 7.1

Airborne radioactivity measurements will be performed as described in the Air Monitoring Procedure (Appendix E to the Removal Action Work Plan).

7.6 Contamination Monitoring

Samples shall be obtained periodically in work areas to ensure that radioactivity is present at acceptable levels and is prevented from leaving the Site. Decontamination of elevated areas will be performed to maintain contamination at levels that are ALARA.

Before leaving the exclusion zone, Site personnel shall be checked through use of a hand-held frisker to ensure that contamination is not present on skin or clothes. The frisker will be a Ludlum Model 3 survey meter with a pancake G-M probe (or equivalent). The trigger level for frisking will be any detectable counts above background in accordance with ALARA practices. The Field Team Leader will be immediately informed regarding any contamination on individuals and will initiate appropriate decontamination techniques. Proper disposition of contaminated personal effects and clothing also will be the responsibility of the Field Team Leader.

7.7 Total Organic Vapor Monitoring

In addition to the radiological contaminants, there is a very slight potential of encountering organic vapors. Thus, no routine screening for organic vapors will be conducted during the removal action. However, if organic odors are encountered during the field work screening for total organic vapors will be conducted with a photoionization detector (PID), or similar type equipment, on a daily basis. The screening will evaluate ambient photoionization volatile organic vapors and some semivolatile organic vapors.

Total organic vapors in ambient air will be obtained periodically with a PID during daily field activities. The PID provides real-time readings of exposure to volatile organics and some semi-volatile organics. Measurements will be made daily, prior to activities, to determine background levels. Monitoring measurements will be taken when:

- operations change,
- work moves to a different portion of the Site, and
- personnel observe contaminated materials.

These screening operations will be used to identify conditions requiring an upgrade to full-face respirators as described in Section 7.8.2.

7.8 Action Levels

7.8.1 Radiological Action Levels

Radiological action levels for on-site workers will be determined by performing surveillance surveys as well as airborne particulate monitoring for the presence of radioactivity. Properly trained Health Physics Technicians will perform radiological monitoring. The radioactive contamination on the Site is particulate and insoluble in water. Therefore, there will be no fixed contamination on the workers. Action levels as determined by radioactive monitoring can be found in Table 7.1.

To avoid the need for upgrade of personal protection equipment due to airborne contamination, engineering controls such as the use of water to minimize dust levels will be implemented as necessary during excavation and restoration activities.

7.8.2 Organic Vapors Action Levels

AECOM is taking a conservative approach to organic vapor monitoring at the Site. A PID will be used to periodically monitor for organic vapors or when odors indicated the possibility of organic contamination. Operations will be discontinued if the PID reads 5 ppm or greater above background and the area will be evacuated. The Site Health and Safety Officer will retest the area wearing a full-face respirator. Operations will not resume until the PID reads less than 5 ppm, and remains below 5 ppm.

TABLE 7-1
ACTION LEVELS AS DETERMINED BY RADIOACTIVITY

Note:

Personnel shall not be exposed to airborne radioactivity such that their weekly intake exceeds 12 Derived Air Concentration (DAC)-hours without prior approval of the Field Team Leader or designee.

Level of protection may be increased to Level C (full-face air purifying respirator) when airborne monitoring indicates that contamination levels have reached 30% of the DAC. All assessments shall incorporate ALARA principles. Engineering controls shall be used prior to assignment of respiratory protective equipment.

Signs shall be posted at entrances to areas where airborne radioactivity levels exceed, or have the potential to exceed, 25% of the DAC.

The most restrictive DAC of the nuclides which may be present onsite is Th-232. The DAC for Th-232 Class W is $5x10^{-13}$ uCi/ml. The air effluent limit is $4x10^{-15}$ uCi/ml. Engineering controls will be utilized so that no visible dust is present and airborne radionuclide concentrations will be kept ALARA.

Radiation Type	Action Level	Level of Respiratory Protection/Action
a. Contamination on smear samples of equipment	20 dpm/100 cm^2 gross alpha	Decontamination required prior to release for unrestricted use.
b. Contamination surveys of personnel or equipment	Count rate greater than background levels	Decontamination required prior to leaving exclusion zone.
c. Airborne Radioactivity	30% DAC[(c)]	Consider Level C (full-face APR) based upon ALARA evaluation. Ensure proper posting. Consider internal monitoring
d. Ambient Gamma (work areas)	5 mrem/hr[(d)]	Consider procedures for shielding of soils. Ensure proper posting.
e. Ambient Gamma (off-site areas)	2 mrem/hr[(e)]	Implement immediate controls to reduce dose equivalent rate.

Notes

(c) Potential Airborne Radioactivity Area as defined in 10 CFR 20. Workers with 1000 DAC-hours per year to date must wear modified Level C (full-face APR) until the end of the calendar year.

(d) The ambient gamma dose equivalent rate action level of 5 mrem/hr stems, from the 10 CFR 20 radiation area definition. If the ambient gamma dose equivalent rate reaches 2 mrem/hr, one or more of the following actions will be implemented: The source may be shielded; the working distance from the source may be increased; or the worker's exposure time may be limited.

(e) The ambient gamma action level for off-site is based upon the 10 CFR 20 requirements to maintain dose equivalent rates in unrestricted areas such that they do not exceed 0.002 rem in any one hour.

8.0 PERSONAL PROTECTIVE EQUIPMENT

It is anticipated that most excavation activities in designated exclusion zones can be conducted in Level D personal protective equipment (PPE), with a contingency upgrade to Level C, based on the action levels listed in Section 7. Level C will be used when required by Special Work Permits, or when directed by the Field Team Leader.

Level D personal protective clothing and equipment for excavation activities includes:

- Coveralls, disposable or washable through a contaminated clothing vendor. Coveralls are to be removed at the boundary of the exclusion zone.
- Hard hat
- Steel toed boots and chemically resistant booties (exclusion zone)
- Cotton or leather gloves (no soil contact); Nitrile gloves (Edmont 37-15 or equivalent) 0.40 mm thickness to be used if hand contact with soils is probable.
- Safety glasses
- Dust mask (optional)

Level C protective clothing and equipment includes:

- Full-face air-purifying respirator (NIOSH/MSHA approved) fitted with radionuclides/HEPA cartridges and/or organic vapor cartridges, depending on which action levels are exceeded (see Section 7 of this HASP)
- Coveralls
- Tyvek coveralls - required in areas when splashing by contaminated soils or water is a possibility
- Nitrile gloves (Edmond 37-15 or equivalent) 0.40 mm thickness
- Disposable latex inner gloves - required in areas when splashing by contaminated soils or water is a possibility
- Nitrile outer gloves (taped) - required in areas when splashing by contaminated soils or water is a possibility
- Steel toe boots with outer chemically resistant booties (taped)
- Hard hat

Action levels used to determine the need to upgrade or downgrade the levels of protection are described in Section 7 of this HASP.

9.0 CONTAMINATION REDUCTION PROCEDURES

9.1 Equipment

Portable equipment will be decontaminated with soap and water and rinsed with tap water. Heavy equipment will be steam-cleaned with water and, if necessary, a detergent solution.

9.2 Personnel

If levels of radioactivity show that individuals can remove coveralls and other personal protective clothing and equipment before leaving the exclusion zone and, thus complete decontamination, the individuals may leave the exclusion zone. If, however, levels of radioactivity show that individuals cannot achieve decontamination by the removal of coveralls and showering is required, they will be dressed in clean coveralls, boots and gloves and be transported to Northwestern Memorial Hospital to complete decontamination.

If substantial skin contamination occurs on an individual working with radioactive materials, the following specific procedures should be followed to prevent fixation of the material in the skin or absorption of the radioactivity through the skin.

Immediate Action: Notify the HSC or Field Team Leader, who will supervise the decontamination. If contamination is spotty, the HSC or Field Team Leader will supervise the cleaning of the individual spots with swabs, soap, or water. If the contamination is general, the HSC or Field Team Leader may recommend washing the area gently in warm or cool water (not hot) using hand soap (not detergent) for one minute. Rinse, dry, and monitor for radioactivity. This soap wash step may be repeated three times.

Evaluation: If the above procedure fails to remove all the skin contamination, the treatment should cease. An evaluation of the skin contamination should be performed by the HSC or Field Team Leader including an estimate of the dose commitment to the skin, and the quantity and identity of the nuclides contaminating the skin If additional decontamination steps are necessary, they are performed and documented by the HSC. The guidelines for Personnel Decontamination in the Radiological Health Handbook, HEW 1970, beginning on page 194, can be used as applicable. **CAUTION**: Do not use chemicals for personnel decontamination until full evaluation of the contamination is made by the HSC or Field Team Leader.

9.3 Contamination Prevention

Work practices that minimize the spread of contamination will reduce worker exposure and help ensure valid sample results by precluding cross-contamination. Procedures for contamination avoidance include:

- Knowing the limitations of all personal protective equipment being used;
- Avoiding walking through areas of obvious or known contamination;
- Refraining from handling or touching contaminated materials directly. Do not sit or lean on potentially contaminated surfaces;
- Ensuring personal protective equipment has no cuts or tears prior to donning;
- Fastening all closures on suits, covering with tape if necessary;
- Taking steps to protect against any skin injuries;
- Staying upwind of airborne contaminants; and
- When working in contaminated areas, refraining from eating, chewing gum, smoking, or engaging in any activity from which contaminated materials may be ingested

9.4 Disposal Procedures

All discarded materials, waste materials, or other field equipment and supplies should be handled in such a way as to preclude the spread of contamination, creating a sanitary hazard, or causing litter to be left on-site. All potentially contaminated waste materials (i.e., clothing, gloves) shall be monitored and segregated in accordance with monitoring results into either radioactive or non-radioactive waste. Appropriate labels shall be affixed to all containers of radioactive materials.

10.0 GENERAL WORK PRECAUTIONS

10.1 General Work Precautions

The following general work precautions apply to all Site personnel.

- Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand-to-mouth transfer and ingestion of material is prohibited in the work area.
- Hands and face must be thoroughly washed upon leaving the work area. Wash water will be provided at the Site for this purpose.
- Whenever levels of radioactivity warrant, the entire body should be thoroughly washed, as soon as possible, after the protective coveralls and other clothing are removed as part of the decontamination process.
- No facial hair that interferes with a satisfactory fit of the mask-to-face-seal is allowed on personnel required to wear respirators.
- Contact with contaminated or suspected contaminated surfaces should be avoided. Whenever possible, do not walk through puddles, leachate, discolored surfaces, kneel on ground, lean, sit, or place equipment on drums, containers, or the ground.
- Medicine, drugs and alcohol may interfere with or impair judgment and reaction times. Therefore, usage of prescribed drugs must be specifically approved by a qualified physician and made known to the Field Team Leader prior to an individuals' presence on the work-site. Alcoholic beverage intake is strictly prohibited at the Site and prior to work.
- All personnel must be familiar with standard operating procedures and any additional instructions and information contained in the HASP.
- All personnel must adhere to the requirements of the HASP.
- Contact lenses are not permitted when respiratory protection is required or where the possibility of a splash exists.
- Personnel must be cognizant of symptoms for radiological exposure onsite, for heat stress and cold stress, and knowledgeable regarding emergency measures contained in the Emergency Contingency Plan.
- Respirators shall be cleaned and disinfected after each day's use or more often, if necessary.
- Prior to donning, respirators shall be inspected for worn or deteriorated parts. Emergency respirators or self-contained devices will be inspected at least once a month and after each use.
- Each employee shall be familiar with the project's Respiratory Protection Program.

10.2 Operational Precautions

The following operational precautions must be observed at all times.

- All Site personnel shall be adequately trained and thoroughly briefed on anticipated hazards, equipment to be worn, safety practices to be followed, emergency procedures, and communications.
- All required respiratory protective devices and clothing shall be worn by all personnel going into areas designated for wearing protective equipment.
- All Site personnel shall use the buddy system when wearing respiratory protective equipment. At a minimum, a third person, suitably equipped as a safety backup, is required during extremely hazardous entries.
- During continual operations, on-site workers act as a safety backup to each other. Off-site personnel provide emergency assistance.
- Personnel should practice any unfamiliar operations prior to undertaking the actual procedure.
- Entrance and exit locations shall be designated and emergency escape routes delineated. Warning signals for Site evacuation must be established.
- Personnel and equipment in the contaminated. work area should be minimized, consistent with effective Site operations.
- Work areas for various operational activities shall be established.

- Procedures for leaving a contaminated area shall be planned and implemented prior to going on-site. Work areas and decontamination procedures shall be established based on expected Site conditions.
- Frequent and regular inspection of Site operations will be conducted to ensure compliance with the HASP. If any changes in operation occur, the HASP will be modified to reflect those changes.

11.0 SANITARY FACILITIES

11.1 Potable Water

a. An adequate supply of potable drinking water shall be maintained at all times immediately outside the Site. Drinking water shall meet all federal, state and local health requirements.
b. Drinking water shall be supplied to project personnel via approved dispensing sources.
c. Paper cups shall be permitted for the drinking of potable water supplies.
d. Drinking water dispensers shall be clearly marked and shall, in no way, have the potential for contamination from non-potable supplies.
e. Site personnel must be fully decontaminated prior to approaching the drinking water supply.

11.2 Toilet Facilities

a. Adequate toilet facilities shall be provided at the Site.
b. These facilities shall be in the form of portable chemical toilets.
c. Routine servicing and cleaning of the toilets should be established with the selected contractor and shall be in accordance with federal, state, and local health regulations.
d. Site, personnel must be fully decontaminated prior to approaching the toilet facilities.

11.3 Washing Areas

a. Adequate washing areas shall be provided for personal use within the work area.
b. Washing areas shall be maintained in a sanitary condition and will be provided with adequate supplies of soap, towels for drying, and covered waste receptacles.
c. Washing areas shall be maintained and sanitized daily.
d. No eating, drinking or smoking shall be permitted in the work area. This policy will be strictly enforced by the Field Team Leader.

12.0 FIRE CONTROL EQUIPMENT

An adequate number of approved portable fire extinguishers (class rated A, B and C) shall be readily available at the Site at all times.

All Site personnel shall be trained in the use of the extinguishers. Extinguishers shall only be used on outbreak stage fires or fires of minor nature. The local fire department shall be contacted in the event of a larger fire and Site evacuation procedures should be commenced in accordance with the procedures described in the Emergency Contingency Plan.

13.0 CONFINED SPACE PROGRAM

13.1 Purpose

In the event that confined space work is a necessity, a Confined Space Program will be implemented. Training in the recognition of confined spaces is a component of the health and safety training program.

The purpose of the Confined Space Program is to establish procedures to protect personnel from this serious hazard in the course of their work; and at a minimum, to comply with 29 CFR OSHA 1910.146. This document assigns responsibilities and sets standards for personnel engaged in activities where confined spaces may be present.

13.2 Responsibilities

13.2.1 Health and Safety Coordinator

The Health and Safety Coordinator administers the Confined Space Program. The Health and Safety Coordinator's responsibilities include:

- Review of the HASP for potential confined space hazards and design alternative approaches to accomplish the confined space tasks;
- Coordinating and managing the Confined Space Program in the event one is required;
- Establishing priorities for implementation of the program;
- Assisting with recognition and implementation of the Confined Space Program;
- Advising project management on confined space issues; and
- Communicating the Confined Space Program to personnel by training related to specific Site activities.

13.2.2 Project Manager

The Project Manager directs the application of the Confined Space Program to project work. The Project Manager is responsible for:

- Working with the Health and Safety Coordinator to prepare information describing activities that might be conducted in a confined space area;
- Assuring that all personnel engaged in project activities are familiar with the definition of a confined space;
- Assuring that personnel are familiar with the Confined Space Program, and that project activities are conducted in compliance with the Confined Space Program;
- Assuming the responsibilities of the Field Team Leader if another person is not assigned these responsibilities.

13.2.3 Field Team Leader

The Field Team Leader is responsible for the implementation of the Confined Space Program on-site during field activities. The Field Team Leader is responsible for:

- Overseeing implementation of the Confined Space Program during field operations; and
- Reporting confined space work activity, and any violations of the Confined Space Program, to the Project Manager and the Health and Safety Coordinator.

13.2.4 Personnel

Personnel are responsible for:

- Familiarizing themselves with the Confined Space Program and following it;
- Becoming familiar with the criteria for determining a confined space, and with the monitoring, permitting, and other requirements of the program; and
- Reporting immediately a confined space condition to the Field Team Leader.

13.3 Definition of a Confined Space

Confined space means a space that:

1. Is large enough and so configured that an employee can bodily enter and perform assigned work
2. Has limited or restricted means for entry or exit (such as pits, storage bins, hoppers, crawl spaces, and storm cellar areas)
3. Is not designed for continuous employee occupancy

Any workspace meeting all of these criteria is a confined space and the Confined Space Program must be followed.

13.4 Confined Space Entry Procedures

13.4.1 Safety Work Permit Required

All spaces shall be considered permit-required confined spaces until the pre-entry procedures demonstrate otherwise. The Safe Work Permit for entry into a confined space must be completed before work begins; it verifies completion of the items necessary for confined space entry. The Permit will be kept at the Site for the duration of the confined space work. If there is an interruption of work, or the alarm conditions change, a new Permit must be obtained before work begins.

A permit is not required when the space can be maintained for safe entry by 100% fresh air mechanical ventilation. This must be documented and approved by the Health and Safety Coordinator. Mechanical ventilation systems, where applicable, shall be set at 100% fresh air.

The Field Team Leader must certify that all hazards have been eliminated on the Entry Permit. If conditions change, a new permit is required.

13.4.2 Pre-entry Testing for Potential Hazards

a. Surveillance

   Personnel first will survey the surrounding area to assure the absence of hazards such as contaminated water, soil, or sediment, barrels, tanks, or piping where vapors may drift into the confined space.

b. Testing

   No personnel will enter a confined space if any one. of these conditions exists during pre-entry testing. Determinations will be made for the following conditions:

   1. Presence of toxic gases or dusts: Equal to or more than 5 parts per million (ppm) on the organic vapor analyzer with an alarm, above background outside the confined space area; or other action levels for specific gases, vapors, or dusts as specified in the Health and Safety Plan and the Confined Space Permit based on knowledge of Site constituents;

   2. Presence of explosive/flammable gases: Equal to or greater than 10% of the Lower Explosive Limit (LEL) as measured with a combustible gas indicator or similar instrument (with an alarm); and

3. Oxygen Deficiency: A concentration of oxygen in the atmosphere equal to or less than 19.5% by volume as measured with an oxygen meter.

Pre-entry test results will be recorded and kept at the Site for the duration of the job by the Field Team Leader. Affected personnel can review the test results.

c. Authorization

Only the Field Team Leader and the Health and Safety Coordinator can authorize any personnel to enter into a confined space. This is reflected on the Safe Work Permit for entry into a confined space. The Field Team Leader must assure that conditions in the confined space meet permit requirements before authorizing entry.,

d. Safe Work Permit

1. A Safe Work Permit for confined space entry must be filled out by the Health and Safety Coordinator or Field Team Leader. A copy of the Safe Work Permit is included as Figure 5.2.

e. Attendants

One worker will stand by outside the confined space ready to give assistance in the case of an emergency. Under no circumstances will the standby worker enter the confined space or leave the standby position. There shall be at least one other worker not in the confined space within sight or call of the standby worker.

f. Observation and Communication

Communications between standby worker and entrant(s) shall be maintained at all times. Methods of communication that may be specified in the Safe Work Permit and the HASP may include voice, voice by powered radio, tapping or rapping codes, signaling tugs on rope, and standby worker's observations that activity appears normal.

13.4.3 Rescue Procedures

Acceptable rescue procedures include entry by a team of rescuers only if the appropriate self-contained breathing apparatus (SCBA) is available; or use of public emergency services.

The standby worker must be trained in first aid, CPR, and respirator use. A first aid kit should be on hand and ready for emergency use. The standby worker must be trained in rescue procedures. Retrieval of an unconscious victim in a confined space will only be conducted by trained rescue personnel. An emergency call to 911 will be initiated to assist the victim.

13.5 Training

Personnel who will engage in field activities will be given annual training on the requirements and responsibilities in the Confined Space Program and on OSHA 1910.146. Only trained personnel can work in confined spaces. Workers should be experienced in the tasks to be performed, instructed in proper use of respirators, lifelines and other equipment, and practice emergency procedures and self-rescue.

Before each Site activity, the determination of confined space work will be part of the Site characterization process. Training in the site-specific confined space activities will be part of the site-specific health and safety training:

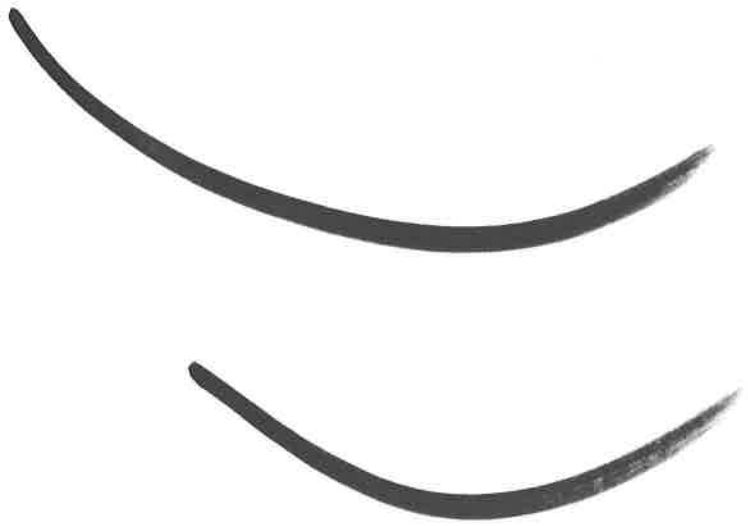
13.6 Safe Work Practices

- Warning signs should be posted. These include warnings for entry permits, respirator use, prohibition of hot work and emergency procedures and phone numbers.
- Cylinders containing oxygen, acetylene or other fuel such as gasoline must be removed a safe distance from the confined space work area.
- Purging and ventilating is done before work begins to remove hazardous vapors from the space. The space should be monitored to ensure that the gas used to purge the space (e.g. tank) has also been removed. Local exhaust should be used where general exhaust is not practical.
- The buddy system is used at all times. A standby person always must be posted within sight of, or in communication with, the person inside the confined space. The standby should not enter the confined space, but instead will call for help in an emergency and not leave the post. Communication should be maintained at all times with workers inside the confined space.
- Emergency planning in the HASP and a Safe Work Permit must be approved in advance and the proper rescue equipment must be immediately available.

14.0 ELECTRICAL LOCKOUT/TAGOUT

The Field Team Leader must approve all work in areas requiring lockout/tagout procedures. Specific procedures and permitting requirements will be specified in the HASP, or in a revised HASP based on the need for a worker to work around electrical equipment.

All systems must be locked out and tagged before the work begins. This includes pipes, air lines, electrical equipment and mechanical devices. The equipment must be start tested and approved for use by a worker by the Health and Safety Coordinator or the Field Team Leader by start-testing to make sure the locked-out equipment does not operate.



Lindsay M. Scalise

From: Kornder, Steve <Steve.Kornder@aecom.com>
Sent: Wednesday, December 05, 2012 1:39 PM
To: Simon.Verneta@epamail.epa.gov
Cc: alex.p@ovcchicago.com; Martwick.Cathleen@epamail.epa.gov; Jablonowski.Eugene@epamail.epa.gov; jose.m@ovcchicago.com; Fulghum.Mary@epamail.epa.gov; Vincent S. Oleszkiewicz; McHale, Daniel; Rowe, Joshua
Subject: 164 E. Grand - Request to Proceed Pursuant to 211 E. Grand Work Plan
Attachments: App F - Specs.pdf; App D - SOPs.pdf; App E - Plans.pdf

Good Afternoon Verneta:

Per our conversation this morning remediation at 164 E Grand is scheduled for this Saturday (December 8). We anticipate starting the remediation work at approximately 8AM after conducting a tailgate safety meeting for the planned work. We intend to complete the remediation in a single day and would like to collect a verification sample for each area on Saturday if the field instrumentation indicates we have successfully remediated the areas so that we can get signoff to begin backfilling the excavations and placing sub-grade within the building interior early Monday.

The work will be conducted utilizing the procedures and methods approved for other projects within Streeterville. Standard operating procedures (SOPs) and a health and safety plan (USEPA Streeterville) were approved for this project as part of the interim response action letter. Per the email below, we have attached the remainder of the SOPS, Plans and Specification that were approved for the 211 E Grand Ave project. Since the volume to be remediated is relatively small, we will be using 1 cubic yard bags and the work will occur inside of a building, air monitoring will be limited to personnel air monitors (PAMs). In any case, dust control procedures (i.e., water if necessary) will be utilized to minimize the generation of dust.

Please contact us if you have any questions regarding the above plans. Thank you again very much for your assistance with these activities.

Sincerely,

Steve Kornder, Ph.D.
Senior Project Geochemist
D 847.279.2448
C 262.515.7700 (New Cell Number)

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From: Fulghum.Mary@epamail.epa.gov [mailto:Fulghum.Mary@epamail.epa.gov]
Sent: Tuesday, December 04, 2012 5:04 PM
To: Vincent S. Oleszkiewicz
Cc: alex.p@ovcchicago.com; Martwick.Cathleen@epamail.epa.gov; Jablonowski.Eugene@epamail.epa.gov; jose.m@ovcchicago.com; Kornder, Steve; Simon.Verneta@epamail.epa.gov
Subject: Re: 164 E. Grand - Request to Proceed Pursuant to 211 E. Grand Work Plan

Vince- I will confirm with my colleagues tomorrow morning that Steve Kornder's email and your note is consistent with the approach we discussed earlier today. Also, just to be clear, "known contamination" refers to any radiologically contaminated material greater than 7.1 pCi/g that is identified at the property and is not limited to the contamination that has been identified to date. Verneta Simon noted it would be helpful to have a single compilation of all the relied upon

plans and SOPs so we are all working from the same set of documents in hand. We look forward to the cleanup! Thank you. --Mary

Mary L. Fulghum
Associate Regional Counsel
U.S. EPA Region 5
77. W. Jackson Blvd.
Chicago, IL 60604

(312) 886-4683 voice
(312) 692-2469 fax

"Vincent S. Oleszkiewicz" ---12/04/2012 04:24:42 PM---Mary and Cathy - As we discussed, please see the email below from Steve Kornder requesting approval

From: "Vincent S. Oleszkiewicz" <VOleszkiewicz@LeechTishman.com>
To: Mary Fulghum/R5/USEPA/US@EPA, Cathleen Martwick/R5/USEPA/US@EPA, VERNETA SIMON/R5/USEPA/US@EPA, EUGENE JABLONOWSKI/R5/USEPA/US@EPA,
Cc: "alex.p@ovcchicago.com" <alex.p@ovcchicago.com>, "jose.m@ovcchicago.com" <jose.m@ovcchicago.com>, "Steve.Kornder@aecom.com" <Steve.Kornder@aecom.com>
Date: 12/04/2012 04:24 PM
Subject: 164 E. Grand - Request to Proceed Pursuant to 211 E. Grand Work Plan

---

Mary and Cathy -

As we discussed, please see the email below from Steve Kornder requesting approval of the Remedial Work Plan for 164 E. Grand Ave., which relies upon the plans and SOP's developed for the Ronald McDonald House Charities site at 211 E. Grand. This Work Plan will be implemented to remediate the known contamination at the Site, as EPA has required in your email to me of yesterday December 3, 2012.

My client wants very much to proceed as soon as possible, and as early as this Saturday December 8, 2012. Please let us know if it is acceptable for us to proceed as outlined in Steve's email below. Steve will contact Verneta directly to discuss sign off verification.

Thanks for your cooperation with this.

Vince Oleszkiewicz

PLEASE NOTE OUR NEW CONTACT INFORMATION:

Vincent S. Oleszkiewicz
voleszkiewicz@leechtishman.com

LEECHTISHMAN

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Direct: 630.536.1172 | Mobile: 630.217.1032 | Main: 630.505.1600 | Fax: 630.505.1608
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Results Matter. EXPECT MORE.

From: Kornder, Steve [mailto:Steve.Kornder@aecom.com]
Sent: Tuesday, December 04, 2012 3:27 PM
To: Vincent S. Oleszkiewicz
Cc: Alex Polanco

Subject: 164 Grand - Request to Use 211 E Grand Work Plan

As discussed earlier today, we would like to proceed with remediation of the known contamination utilizing the methods and SOPs that have historically been used for Streeterville projects. A schedule for conducting the work is currently being developed, and with USEPA approval of the methods and procedures, the remediation could potentially occur as early as Saturday December 8. It is anticipated that the work can potentially be completed within a single day and arrangements for sign-off of the remediated areas will have to be discussed. Once the areas are remediated and signed off by USEPA, we would like to proceed immediately with the backfilling of the excavations and creation of a level interior grade in order to allow the interior masonry work to continue. The Interim Response Action Letter approved for the site (dated October 29, 2012) already includes an approved HASP and SOPs for surveying and air monitoring. For the 164-166 E. Grand site we would also like to propose supplementing these procedures using the plans and SOPS that were developed and approved in the Work Plan for the Lindsay Light II Operable Unit 16 site (211 E. Grand Ave.) Docket No. V-W-01-C-960.

Please contact us if you have any questions.

Sincerely,

Steve Komder, Ph.D.
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C 262.515.7700 (New Cell Number)

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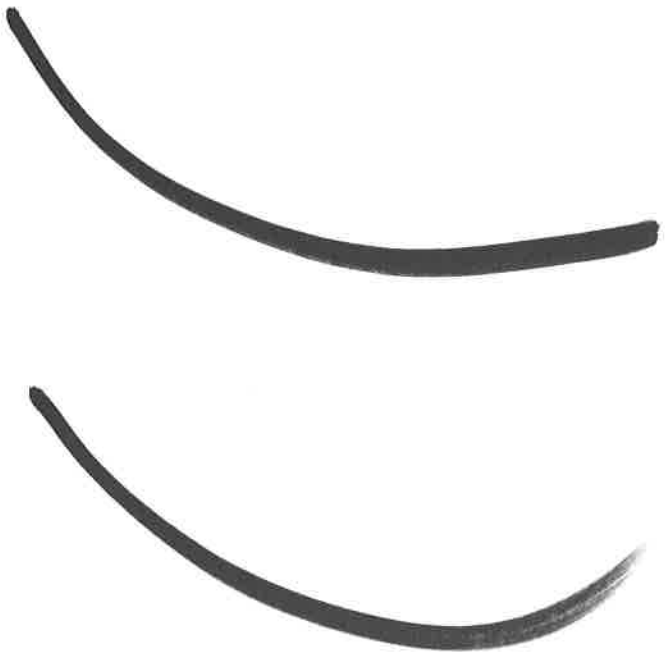

Appendix D

Standard Operating Procedures

SOP-210 **Gamma Radiological Surveys**
SOP-212 **Air Monitoring Procedure**
SOP-214 **Soil Sampling Procedure**
SOP-215 **Field Logbook Procedure**
SOP-217 **Excavation Procedure**
SOP-223 **Verification Survey**
SOP-343 **Operation of Ludlum Model 2221 Scaler/Ratemeter with Ludlum Model 44-10 2"x2" NaI Scintillation Probe**
SOP-345 **Survey for Surface Contamination and Release of Equipment for Unrestricted Use**
SOP-347 **Decontamination**
SOP-364 **Sample Preparation Procedure for Gamma Spectral Analysis**

211 EAST GRAND AVENUE
CHICAGO, IL

STANDARD OPERATING PROCEDURE

Title: Gamma Radiological Surveys

Document: SOP-210

Revision Number:

Date: November 5, 2010

Replaces: New

GAMMA RADIOLOGICAL SURVEYS

1.0 PURPOSE

This procedure provides protocols for conducting gamma radiological surveys for potentially contaminated soil and/or fill material.

2.0 SCOPE

Radiological surveys will be performed at the designated Site as part of the pre-excavation, excavation, pre-verification, and/or verification surveying programs.

3.0 REFERENCES

- NUREG 1507 – *Minimum Detectable Concentrations With Typical Radiation Survey Instruments for Various Contaminants and Field Conditions*
- NUREG 1575, Rev. 1 - Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)

4.0 EQUIPMENT AND MATERIALS

The following equipment may be used as part of the survey programs. Other equipment may be substituted if necessary because of availability of the items listed or the conditions encountered at the site.

- Trimble Pathfinder Pro XR 4.1 global positioning system (GPS), or equivalent (optional).
- Ludlum Model 44-10 2-inch by 2-inch sodium iodide (NaI) (Tl) gamma detector.
- 6-inch collimated lead shield for detector.
- Ludlum Model 2221 portable scaler ratemeter analyzer.

5.0 INSTRUCTIONS FOR RADIOLOGICAL SURVEY

5.1 Establishment of Background Gamma Count Rate

5.1.1 The gamma count rate background levels shall be established for each applicable survey instrument. Six randomly selected locations of similar media (i.e., paved, landscaped, etc.) shall be chosen in non-radiologically impacted areas of the Site. A one-minute integrated count shall be obtained at the surface of each location for each survey instrument (Ludlum 2221 with 2" X 2" NaI probe). The measurements collected from each location shall be averaged to establish an instrument specific background gamma count rate.

5.2 Land Surface Survey Procedure - Manual

5.2.1 Establish a Grid Network

5.2.1.1 Two perpendicular baselines will be established.

5.2.1.2 A grid along the baseline will be established using cloth or steel tape and a compass, if necessary. Stakes, survey flags, or paint will be placed as needed to delineate grid or traverse lines. The grids will be spaced about five meters apart.

5.2.1.3 The baseline, permanent structures, areas of remediation, and other areas of interest will be illustrated in the field logbook.

5.2.2 Gamma Survey Procedure – Manual Data Recording

5.2.2.1 The Ludlum ratemeter is set for 2-second time-weighted average count rate.

5.2.2.2 Hold the survey meter probe base parallel to the ground surface at a height as close as practical and not more than 3-inches from the ground surface. Note: It is important to keep the meter at a consistent height since counts will vary with the distance from the surface.

5.2.2.3 Walk along grid lines at a maximum speed of about 0.5 meters per second (1 mile per hour). Grid will be traversed with a serpentine pattern, spaced 3 feet apart.

5.2.2.4 Identify locations with count rates greater than twice the background count rate and record them or the Radiation Survey Form – Surface Gamma Scan.

5.3 Land Surface Survey Procedure – Continuous Data Logging with GPS

5.3.1 Gamma Survey Procedure

5.3.1.1 Position the survey meter probe base parallel to the ground surface at a height as close as practical and not more than 3-inches from the ground surface. Note: It is important to keep the meter at a consistent height since counts will vary with the distance from the surface.

5.3.1.2 Traverse the survey area at a maximum speed of about 0.5 meters per second (1 mile per hour). The survey area will be traversed in a serpentine pattern, spaced 3 feet apart.

5.3.1.3 Ludlum and GPS equipment will be interfaced with a computer/data logger that will collect gamma surface readings, and the associated GPS coordinates, at two second intervals.

5.3.1.4The GPS coordinates and gamma survey results will be plotted with locations exhibiting gamma count rates greater than twice background highlighted.

5.4 Radiological Survey of On-Site Materials

5.4.1 Material that is excavated and placed in the clean stockpile will be surveyed two times. The first survey will be performed prior to excavation activities, if the excavation can be entered safely.

5.4.2 The second survey will be performed during the excavation of the non-contaminated soil.

The soils will be surveyed before they are placed in the stockpile. Based on the gamma scan, the material will either be designated as contaminated material and immediately loaded for transportation and disposal or tentatively designated as clean and stockpiled for subsequent soil sampling per SOP-214.

5.5. Daily Surveys

5.5.1 Routine daily surveys shall be performed for each day of operations at the site.

5.5.2 The routine surveys will monitor areas in the immediate vicinity of excavations and along soil movement paths to ensure that radiation levels are not affected by activities.

5.5.3 Routine surveys shall be documented by preparing a drawing of the survey results in the field logbook, indicating either the location and value of individual measurements, or contours of the measured gamma field.

5.5.4 Surveys of excavation areas will be made at the request of the Field Team Leader to assess the progress of the removal. These surveys will not be documented, but will be used by the Field Team Leader to manage the excavation.

5.6 Pre-Verification or Verification Survey

5.6.1 Upon completion of remediation excavation activities, either a pre-verification survey shall be performed to ensure that the excavation is ready for a final verification survey by regulatory authority (i.e., USEPA and/or IEMA) or a verification survey shall be performed to ensure that the excavation is ready for backfill based on the approval of the regulatory authority.

5.6.2 The survey is conducted at the same time as the excavation work phase. The survey method is performed as specified in Sections 5.2 and/or 5.3. Upon completion of the survey and excavation phase, a Notification of Successful Pre-Verification or Verification is sent to the regulatory authority requesting a final verification survey or approval to backfill.

5.7 Site Grading Survey

5.7.1 Surveys will likely be conducted prior to or at the same time as the grading activities and will be performed as specified in Sections 5.2 and/or 5.3 of this SOP.

5.7.2 The corners or boundaries of the area to be surveyed will be tied into a site-wide coordinate/survey network. Stakes, survey flags, or paint will be placed along the boundaries of the survey area using a cloth/steel tape or wheel at approximately 5 meter intervals to subdivide the area into 5 x 5 meter areas.

5.7.3 Each 5 X 5 meter area will be traversed using a line spacing of approximately 1 meter. Readings greater than twice background will be painted and flagged for further investigation.

5.7.4 The maximum gamma count and readings over twice background will be recorded on the radiation survey form for site grading. Permanent structures and other issues of interest also will be included on the radiation survey form.

5.8 Caisson Construction Radiological Surveying

5.8.1 Procedures for Caisson Probe Test Pits

5.8.1.1 The ground surface will be surveyed for elevated gamma radiation prior to beginning excavation. Excavation monitoring will include three survey efforts: 1) surveys of the excavation walls and floor until native sand is encountered, 2) surveys of the excavated fill while still in the excavator bucket and 3) surveys of the excavation spoil pile,.

5.8.1.2 Excavation will proceed in lifts not to exceed 18 inches per lift. The excavation walls and floor will be surveyed at each 18 inch lift until native sand is encountered. Additionally, the excavation spoil pile will be surveyed as excavation proceeds. Appropriate sloping of the test pit walls will be required to allow safe access for persons to enter the excavation for surveying the walls and floor. In the event the excavation is of such a dimension to preclude safe access of personnel to survey the walls and floor, surveys of the spoil will be done in the excavator bucket and spoil pile to characterize the in-place material.

5.8.1.3 If elevated gamma radiation measurements are noted, equal to or exceeding twice the background gamma count, the excavation will proceed in thinner lifts, 6 to 12 inches. If

the excavated fill exceeds the applicable cleanup standard, the radiologically-impacted fill will be staged on plastic separate from the clean soil and the pile will be marked with radiation rope. Alternatively, the impacted fill will be loaded directly into a Baker type box or super-sack.

5.8.1.4 Excavation equipment that has contacted radiologically-impacted fill will be surveyed with a Ludlum Model 3 Pancake Probe for elevated radioactivity. Indications of elevated radioactivity will require decontamination in accordance with the Work Plan SOP 347, Decontamination. Equipment in contact with the radiologically-impacted fill will be documented as clean through a swipe survey and alpha radiation count using the Ludlum Model 220 and Model 43-10 Alpha counter, in accordance with the Work Plan SOP 345, Survey for Surface Contamination and Release of Equipment for Unrestricted Use.

5.8.2 Procedures for Surveying during Caisson Installation

5.8.2.1 Areas previously screened to native soil will not be resurveyed. Auger spoils from caisson borings through unscreened fill (including fill from below the groundwater table) will be screened after the materials are removed from the borehole.

5.8.2.2 When practical, spoil on the caisson augers will be screened before being spun off. If the field screening indicates elevated gamma measurements, the auger spoil will be spun off onto an area covered with plastic to temporary contain the material for later placement in containers for offsite transport and disposal. Clean fill will be spun off and handled as appropriate for soil management.

5.8.2.3 Management of impacted fill during caisson construction will consist of the following. Radiation-trained laborers or excavating equipment will place that fill into approved containers (Baker type boxes or super-sacks, depending on apparent volume).

5.8.2.4 Prior to moving to a new location the Health Physics Technician will release the auger and other equipment that may have come in contact with impacted fill using SOP-345. Decontamination procedures are outlined in the Work Plan SOP 347.

5.8.3 Required Documentation

5.8.3.1 Caisson locations found to contain impacted fill and will be recorded. The background gamma count and maximum gamma radiation reading will be noted, along with the equipment specific threshold indicative of 7.1 pCi/g total radium and the depth at which the impacted fill material was encountered. Records will also identify any samples taken, the person(s) conducting the monitoring, the date the work was started and completed, and equipment serial numbers.

AECOM

211 EAST GRAND AVENUE
CHICAGO, IL

STANDARD OPERATING PROCEDURE

Title: Air Monitoring Procedure

Document: SOP-212

Revision Number: 0

Date: November 5, 2010

Replaces: New

AIR MONITORING PROCEDURE

1.0 INTRODUCTION

The Air Monitoring Procedure provides for measuring the concentration of radioactive airborne dust that could be generated and emitted into the atmosphere as a result of the excavation, moving, and loading activities planned at the Site. The objectives of data collection for air monitoring activities are as follows:

- Collect airborne radioactivity data for the purpose of determining the exposure of workers participating in Site activities to airborne particulates
- Collect airborne radioactivity data to measure releases of airborne radioactivity to the environment and ensure that people living and working in the surrounding areas of the Site are not exposed to radiation above acceptable limits
- Collect airborne radioactivity data to evaluate work procedures and Site control measures for the purpose of keeping exposures to both workers and the general public as low as reasonably achievable (ALARA).

2.0 REGULATORY REQUIREMENTS AND ADMINISTRATIVE LIMITS

As specified in 10 CFR Part 20 (unless more restrictive in 32 IAC 340) the licensee must demonstrate compliance with the dose limits for individual members of the public. The Site Air Monitoring Plan is based on being able to demonstrate that the average concentrations of radioactive materials in gaseous and liquid effluents at the boundary of the unrestricted area do not exceed the limits specified in Table 2 of Appendix B to 10 CFR 20. The radionuclides in the thorium and uranium series that could potentially be encountered during Site activities are listed in Table 1 of the Air Monitoring Plan. Th-232 has the most restrictive concentrations for both the Derived Air Concentration (DAC) and Air Effluent Limits.

Th-232 Class W DAC=$5x10^{-13}\mu Ci/ml$ Air Effluent=$4x10^{-15}\mu Ci/ml$

Both worker exposure to airborne particulates and effluent release limits will be based on Th-232.

3.0 AIR MONITORING EQUIPMENT AND MATERIALS

- Staplex Model TFIA High Volume Air Samplers (or equivalent)
- Gilan Model BDXII Low Volume Personal Air Sampler (or equivalent)
- Staplex Model TFA810 "Ashless" Filter Papers – 95% collection efficiency of 1-micron particles. Effective efficiency of 70% (penetration absorption 30%)
- Zefon Model 739 MCE Filter Cartridges – 37mm x 0.8um membrane filters
- Ludlum Model 2200 Scaler w/ Model 43-10 alpha scintillation detector
- Radiological Air Sample Data Form – Area Monitors, Form SOP 212-10
- Radiological Air Sample Data Form – Personal Air Monitors, Form SOP 212-11

4.0 SITE AIR MONITORING PROCEDURE

4.1 Background Air Quality

One downwind, high volume air sample shall be collected for a minimum of forty hours (five 10-hour days) prior to the commencement of excavation activities. This sample shall be analyzed the day after collection and then again after four days to allow for the decay of short lived radon and thoron daughters. The count, after four days decay, will serve as the official measurement of the background airborne alpha concentration. Future results during Site operations should be compared to this value to see if further engineering controls or procedural changes are warranted.

4.2 Perimeter Air Monitoring – High Volume Samplers

Four air monitoring locations shall be used during all excavation activities. These monitoring units will be at the property boundary or no more than 200 feet from the limits of the areas anticipated to be excavated. Samples shall be collected during all operations where potentially contaminated soils are being excavated, moved, or loaded. One monitor shall be placed on each perimeter of the site (North, South, East, and West) and collect samples at a height between one and two meters above the ground. Monitors will be located so as to provide unobstructed air flow from the source to the monitors. Flow rate through air samplers shall remain between 20 and 60 cubic feet per minute. Air sample filters shall be collected and replaced daily and submitted to the laboratory for analysis. Samples analyzed from the perimeter high volume monitors shall be used to determine the amount of airborne radionuclides leaving the Site.

4.3 Personal Air Monitoring – Lapel Samplers (Low Volume)

All workers participating in Site activities that involve the excavation, movement, or loading of potentially contaminated soils within a radiological exclusion zone shall wear a Personal Air Monitor (PAM) to evaluate the air quality in the worker's breathing zone. The Health and Safety Coordinator may require that additional personnel wear PAMs if there is a potential for that worker to encounter airborne particulates during Site operations. Samples shall be collected the entire time a worker is inside the exclusion zone and the cumulative time recorded. Flow rate through air samples shall remain between 2 and 4 liters per minute. Air sample filters shall be collected and replaced daily and submitted to the laboratory for analysis. Samples analyzed from the PAMs shall be used to determine potential contributions to worker's dose from airborne radionuclides.

5.0 AIR SAMPLE ANALYSIS

The Th-232 decay series contains seven alpha-emitting nuclides: Th-232, Th-228, Ra-224, Rn-220, Po-216, Bi-212 and Po-212. Of these, the first three nuclides can be assumed to be in complete equilibrium. The noble gas Rn-220 (thoron) may be ejected from the original matrix by recoil from the alpha particle decay of Ra-224. The fraction of Rn-220 that is removed via emanation is dependent on several variables, and is assumed to range from 10% to 40%. The emanating fraction is assumed to be transported away from the original matrix. If 40% of the Rn-220 escapes, the activity of the Rn-220 and its three alpha-emitting progeny nuclides will be at 60% of the Th-232 activity. These four alpha-emitting nuclides produce a total of 3.35 alpha emissions per Rn-220 decay. Since the Rn-220 activity is 60% of the Th-232 activity, these four nuclides only emit the equivalent of two alpha particles per Th-232 decay. These two alphas when combined with the three alpha particles from the nuclides in full equilibrium with the parent, result in the total emission of the five alpha particles. Thus, the Th-232 contribution will be one-fifth or 20% of the total alpha activity.

For the reasons stated above, gross alpha concentrations shall be divided by a factor of five to determine the air concentration of Th-232, which is the most limiting of the applicable air effluent concentration limits ($4x10^{-15}$ μCi/ml).

5.1 High Volume Sample Analysis

A 1.75 inch diameter cutout shall be obtained from each 8"x10" high volume sample collected. All data pertaining to the sample shall be included on the *Radiological Air Sample Data Form – Area Monitors* worksheet. This worksheet contains the calculations required to determine total sample volume and sample concentration.

Each sample shall be analyzed the day after collection for gross alpha concentration. The minimum counting time is 30 minutes for Th-Alpha. The "day after" count will serve as a comparison to identify high gross counts from the previous day. It is expected that naturally occurring radon and thorium daughters will interfere with analysis, so the sample must be reanalyzed in four days. Thoron (Rn-220), if present in

significant amounts, will require up to four days to allow for the decay of its Pb-212 daughter (10.6 hour half life). The count, after four days decay, will serve to be the official measurement of Th-Alpha.

Th-232 is the most restrictive of the applicable radionuclides that may be present during Site operations. The Th-232 contribution will account for 20% of the total alpha activity, so each gross alpha count must be divided by five to determine Th-232 concentration.

Multiple concentration measurements improve both precision and detection capability. Although air samples shall be counted the following day (and again four days later), effluent releases shall be reported on a weekly basis using the following calculation:

Equation A.9 NUREG 1400

$$C_{avg} = \frac{\Sigma T_{s,i} C_i}{\Sigma T_s}$$

where C = effluent concentration in μCi/ml
T_s = duration of sample collection

Sample concentration shall be determined using the following calculation:

Equation 6.9 *NUREG 1400*

$$C = \frac{R_n}{EFKT_S Cf(5)}$$

Where: $R_n = R_g - R_b = T_g/N_g - T_b/N_b$
E = fractional filter efficiency
F = air flow rate through the air sampler, cm^3/min
Cubic feet per hour x 28.316 liters/cfh x 1000 ml/ liter
K = Counting efficiency in cpm/ μCi
T_s = duration of sample collection
Cf = collection vs. analyzed ratio: conversion factor = 0.035

** note: Cf is not part of original NUREG calculation. It has been added to account for the fact that we are only analyzing 3.5% of total filter (i.e., a 1.75 inch circle from an 8 X 10 inch filter minus the 0.3 inch border coverd by the filter holding plate).

5 = Samples are analyzed for gross alpha activity. Gross alpha concentration is to be divided by five to determine Th-232 concentration

5.2 Personal Air Monitor Sample Analysis

Personal Air Monitor (PAM) samples shall be analyzed in the same manner as the high volume perimeters samples. The only exceptions are that samples may be collected over the course of one week and that calculations are performed on a different worksheet – *Radiological Air Sample Data Form – PAM's, Form SOP 212-11.*

The action level for airborne radioactivity shall be 30% of the Derived Air Concentration (DAC) for Th-232 ($DAC=5x10^{-13}$ μCi/ml). When PAM analysis indicates that concentrations have reached 1.5×10^{-13} μCi/ml, Level C protection may be considered. It is not anticipated that airborne concentrations will reach this level. Engineering controls, such as wetting of soils, and procedural changes shall be implemented to keep airborne concentrations ALARA.

At the conclusion of the project, data obtained from PAM's shall be used to determine a dose from airborne radionuclides for each monitored worker.

6.0 INVESTIGATIONS AND CORRECTIVE ACTIONS

The Health and Safety Coordinator will perform investigations and responses consisting of one or more of the following actions in the event that Action Levels are exceeded:

- Verification of laboratory data and calculations.
- Analyze and review probable causes.
- Evaluate need for reanalysis or additional analysis on original sample.
- Evaluate need for resampling.
- Evaluate need for sampling of other pathways.
- Evaluate need for notifications to regulators
- Dose assessments/bioassays.

7.0 ATTACHMENTS

- Table 1 *Derived Air Concentrations (DACs) and Effluent Air Concentrations of Selected Radionuclides in the Uranium and Thorium Series*
- Minimum Detectable Concentration Calculation – Area Monitors
- Minimum Detectable Concentration Calculation – PAM's
- Radiological Air Sample Data Form – Area Monitors, Form SOP 212-10
- Radiological Air Sample Data Form – PAM's, Form SOP 212-11

TABLE 1

Derived Air Concentrations (DACs) and Effluent Air Concentrations of Selected Radionuclides in the Uranium and Thorium Series

Radionuclide	Class	10 CFR 20	
		DAC (μCi/ml)	Air Effluent (μCi/ml)
^{238}U	D w Y	$6x10^{-10}$ $3x10^{-10}$ $2x10^{-11}$	$30x10^{-12}$ $1x10^{-12}$ $6x10^{-14}$
^{234}Th	w Y	$8x10^{-8}$ $6x10^{-8}$	$3x10^{-10}$ $2x10^{-10}$
^{234}U	D w Y	$5x10^{-10}$ $3x10^{-10}$ $2x10^{-11}$	$3x10^{-12}$ $1x10^{-12}$ $5x10^{-14}$
^{230}Th	w Y	$3x10^{-12}$ $6x10^{-12}$	$2x10^{-14}$ $3x10^{-14}$
^{226}Ra	w	3x10-10	$9x10^{-13}$
^{222}Rn	With Daughters Removed With Daughters Present	$4x10^{-6}$ $3x10^{-8}$ or 0.33 of working level	$1x10^{-8}$ $1x10^{-10}$
^{214}Pb	D	$3x10^{-7}$	$1x10^{-9}$
^{214}Bi	D w	$3x10^{-7}$ $4x10^{-7}$	$1x10^{-9}$ $1x10^{-9}$
^{210}Pb	D	$1x10^{-10}$	---
^{232}Th	w Y	$5x10^{-13}$ $1x10^{-12}$	$4x10^{-15}$ $6x10^{-15}$
^{228}Ra	w	$5x10^{-10}$	$2x10^{-12}$
^{228}Th	w Y	$4x10^{-12}$ $7x10^{-12}$	$3x10^{-14}$ $2x10^{-14}$
^{220}Rn	With Daughters Removed With Daughters Present	$7x10^{-6}$ $9x10^{-9}$ or 1.0 working level	$2x10^{-8}$ $3x10^{-11}$
^{212}Pb	D	$2x10^{-8}$	$5x10^{-11}$
^{212}Bi	D w	$1x10^{-7}$ $1x10^{-7}$	$3x10^{-10}$ $4x10^{-10}$
^{228}Ac	D w Y	$4x10^{-9}$ $2x10^{-8}$ $2x10^{-8}$	$2x10^{-11}$ $8x10^{-11}$ $6x10^{-11}$
^{234m}Pa	w Y	$3x10^{-6}$ $3x10^{-6}$	$1X10^{-8}$ $9x10^{-9}$
^{235}U	D w Y	$6x10^{-10}$ $3x10^{-10}$ $2x10^{-11}$	$3x10^{-12}$ $1x10^{-12}$ $6x10^{-14}$
^{231}Pa	w Y	$6x10^{-13}$ $2x10^{-12}$	$6x10^{-15}$ $8x10^{-15}$
^{227}Ac	D w Y	$2x10^{-13}$ $7x10^{-13}$ $2x10^{-12}$	$1x10^{-15}$ $4x10^{-15}$ $6x10^{-15}$
^{227}Th	Y w	$1x10^{-10}$ $1x10^{-10}$	$5x10^{-13}$ $5x10^{-13}$

FORM SOP 212-10

RADIOLOGICAL AIR SAMPLE DATA FORM – AREA MONITORS

Equation:

Volume (V) = (Pump ml/min.) (Total Sample Time) (count/sample conversion)
Multiply Cubic Feet by 28.316 to Obtain Liters
Ml/min = (L/min.) (1000 ml/L)

SAMPLE COLLECTION

Sample #	Per. By	Date	Sample Start Time	Sample End Time	Total Sample Time	Cubic Ft/min. (CFM)	Count vs. Sampled Conv.	Total Sample Volume (ml)

Equation: Actual Activity = Activity (A) - Background (B)

$$\text{Activity (A)} = \frac{\text{(Net CPM) (1/Eff.)}}{\text{(V) (2.2 E + 6 dpm/uCi) (filter retention factor) (5)}}$$

Sample #	Cal. By	Date	Gross Counts	Net CPM	Detector Efficiency (EFF)	Sample Volume Analyzed (ml)	Sample Concentration (A)µCi/ml	Background Activity (B)µCi/ml	Actual Concentration µCi/ml
4-day recount									

Filter retention factor/absorption correction = 0.7 for Staplex 8x10 ashless paper filter
= 1.0 for 37mm PAM membrane filters

Note: Activity is divided 5 due to the Thorium daughters that are counted with an open window (gross alpha)

Conversion factor for volume analyzed vs. volume sampled for 1.75" diameter cut-out = 0.035

30 minute background count for _____ (date) is _____ cpm

30 minute background count for _____ (date) is _____ cpm

FORM SOP-212-11

RADIOLOGICAL AIR SAMPLE DATA FORM – PAM'S

Equation:

Volume (V) = (Pump liters/min.) (Total Sample Time in minutes) (1000 ml/liter)

Sample Collection

Person Wearing Monitor	Pump #	Sample #	Date	Sample Start Time	Sample End Time	Total Sample Time	Cubic liters/min. LPM	Total Sample Volume (ml)

Equation: Actual Activity = Activity (A) - Background (B)

Activity (A) = $\frac{\text{(Net CPM) (1/Eff.)}}{\text{(V) (2.2 E + 6 dpm/uCi) (filter retention factor) (5)}}$

Sample Analysis

Sample #	Cal. By	Date	Gross Counts	Net CPM	Detector Efficiency (EFF)	Sample Volume Analyzed (ml)	Sample Concentration (A)µCi/ml	Background Activity (B)µCi/ml	Actual Concentration µCi/ml

Filter retention factor/absorption correction = 0.7 for Staplex 8x10 ashless paper filter
= 1.0 for 37mm PAM membrane filters

Note: Activity is divided 5 due to the Thorium daughters that are counted with an open window (gross alpha)

30 minute background count for _____ (date) is _____ cpm

30 minute background count for _____ (date) is _____ cpm

MINIMUM DETECTABLE CONCENTRATION CALCULATION – PAMS

Sensidyne Personal Air Monitor Samples analyzed on Ludlum 43-10 Alpha Counter

$$MDC = \frac{2.71}{n\,E\,F\,K\,T_g\,T_g} + \frac{3.29\,\sqrt{Rb}\left[\frac{1}{Tb}+\frac{1}{Tb}\right]}{n^{1/2}\,E\,F\,K\,T_s}$$

n = number of sampling intervals
E = fractional filter efficiency
F = airlow rate through the sampler in cm^3/min
K = counting efficiency in cpm/μCi
T_s = duration of sample collection in min
T_g = gross counting time
T_b = background counting time
R_n = net count rate in cpm
R_b = background count rate in cpm
C = concentration of radioactive material in the air in μCi/cm^3

N = 5 days of sampling minimum per week
E = 1.0 37mm 0.8 μm MCE Filters
F = 2.5 x 10^3 cm^3/min (or ml/min)
2.5 liters per minute x 1000 ml/l = 2500 ml/min
K = 699300
0.315 count/disintegration x 2.22 x 106 dis/μCi = 699300 cpm/μCi
T_s = 480 min
Based on a minimum of 8 hours per day
T_g = 30 min
T_b = 600 min

Rb = 0.58 cpm, based on 3000 min background count on 9/16 – 9/20/02

$$MDC = \frac{2.71}{(5)\,(1.0)\,(2500)\,(699300)\,(480)\,(30)} + 3.29\,\frac{\sqrt{(0.58)}\left[\frac{1}{(600)}+\right]\frac{1}{(30)}}{(2.24)\,(1.0)\,(2500)\,(699300)\,(480)\,(30)}$$

= 2.98 x 10^{-14} μCi/ml (gross alpha weekly MDC)
= 5.96 x 10^{-15} μCi/ml (gross alpha ÷ 5, for Th-232)

MINIMUM DETECTABLE CONCENTRATION CALCULATION

Sensidyne TFIA High Volume Air Samples analyzed on Ludlum 43-10 Alpha Counter

$$MDC = \frac{2.71}{n\,E\,F\,K\,T_g\,T_g} \qquad \frac{3.29\,\sqrt{Rb\left[\frac{1}{Tb}+\frac{1}{Tb}\right]}}{n^{1/2}\,E\,F\,K\,T_s\,cf}$$

NUREG 1400 Air Sampling in the Workplace Appendix A (eq A.17)

n = number of sampling intervals
E = fractional filter efficiency
F = airlow rate through the sampler in cm^3/min
K = counting efficiency in cpm/μCi
T_s = duration of sample collection in min
T_g = gross counting time
T_b = background counting time
R_n = net count rate in cpm
R_b = background count rate in cpm
Cf = count vs. sample conversion
(this is not part of NUREG 1400, however, analysis volume must be taken into account)

n = 5 days of sampling minimum per week
E = 0.7 (referred to as filter retention factor on air sampling form)
F = 1.13×10^6 cm^3/min (or ml/min)
40 ft^3/min x 28.316 liters/ft^3 x 1000 ml/l = 1.13×10^6 ml/min
K = 699300
0.315 count/disintegration x 2.22 x 106 dis/μCi = 699300 cpm/μCi
T_s = 480 min
Based on a minimum of 8 hours per day
T_g = 30 min
T_b = 600 min
Cf = 0.035
8" x 10" original filter size = 80 $inches^2$
0.3 inch border is covered by sampler plate and not sampled = 10.8 $inches^2$
filter cutout = $\pi r^2 = (0.875")^2\,(3.14) = 2.41$ $inches^2$
actual sample area = 80 $inches^2$ – 10.8 $inches^2$ = 69.2 $inches^2$
sample analyzed vs. sample collected ration = 2.41/69.2 = 0.035
r_b = 0.58 cpm, based on 3000 min background count on 9/16 – 9/20/02

$$MDC = \frac{2.71}{(5)\,(0.7)\,(1.13E6)\,(699300)\,(0.035)\,(480)\,(30)} + \frac{3.29\,\sqrt{(0.58)\left[\frac{1}{(600)}+\right]\frac{1}{(30)}}}{(2.24)\,(0.7)\,(1.13E6)\,(699300)\,(0.035)(480)\,(30)}$$

= 2.69×10^{-15} μCi/ml (gross alpha weekly MDC)
= 5.39×10^{-16} μCi/ml (gross alpha ÷ 5, for Th-232)

AECOM

211 EAST GRAND AVENUE
CHICAGO, IL

STANDARD OPERATING PROCEDURE

Title: Soil Sampling Procedure

Document: SOP-214

Revision Number: 0

Date: November 5, 2010

Replaces: New

SOIL SAMPLING PROCEDURE

1.0 PURPOSE

The purpose of this procedure is to present protocol for collecting soil samples for the Site.

2.0 SCOPE

This procedure applies to samples collected for radiological or geotechnical analysis. Soil samples may be collected of potential backfill soils or other soils. The Field Team Leader will coordinate the sampling efforts.

3.0 REFERENCES

U.S. Nuclear Regulatory Commission, NUREG/CR-5849, Manual for Conducting Radiological Surveys in Support of License Termination, June 1992.

4.0 EQUIPMENT AND MATERIALS

4.1 Equipment and Materials Management

Downhole tools and samplers are cleaned in accordance with the Decontamination Procedure (SOP-347).

Cuttings, fluids, samples, and water are placed in 55-gallons drums, labeled, properly stored on-site, and disposed of in a manner that does not violate local, state or federal rules or regulations and in a manner that does not damage public or private property.

4.2 Sampling Equipment and Materials

Equipment used for soil sampling includes the following:

- Auger or other Coring Tool
- Shovel and Trowel
- Plastic Collection Bags
- Plastic Sheets (optional)
- Sampling Tracking Form (Form SOP-214-1)
- Field Logbook (SOP-215)
- Field Sample Screening Form (Form SOP-214-2 or holding samples)
- Pin Flags (for marking sample locations)
- Container (for collecting potentially contaminated waste generated during the sampling process) (e.g., gloves, plastic sheets, etc.)
- Bucket (filled with clean rinse water)
- Bucket (for homogenizing samples)
- Stainless Steel Brush
- Moist Towelettes
- Paper Towels
- Latex Gloves
- Survey Instrument (for verifying clean sampling equipment and hands).

Other equipment may be substituted, if necessary, because of availability of the items listed or the conditions encountered at the site. Substitute equipment shall be documented in the Field Logbook and approved by the Field Team Leader.

5.0 SAMPLING PLAN

Selection of the sampling plan to characterize a soil is a function of the goals of the investigation, the variability of the parameters being measured, and the impact of the variability on the conclusions. Samples may be collected randomly or they may be collected from specific areas deliberately chosen to represent the range of conditions expected or unusual conditions of particular interest. In general, randomly chosen samples are appropriate to assess overall site conditions. However, there may be instances where the significance of an observed condition is of interest. The choice of method will, therefore, depend on the specific goals of the sampling activity.

The procedure presents sampling methods based on random sampling. For the reasons stated above, variations to the methods provided in this procedure may be requested by the Field Team Leader. Such variations shall be documented in the Field Logbook by field personnel.

6.0 ON-SITE STOCKPILE SOIL SAMPLING

The following are the steps to be followed for on-site stockpile soil sampling.

6.1. Excavated soil may be stockpiled. Samples from the stockpiles may be analyzed.

6.2. The soil may be stockpiled in piles varying from a few to several thousand cubic yards. Because of this potential variation in pile size, no single method for sampling or type of equipment can be prescribed that will work for every situation. The two basic methods that can be used for sampling stockpiles, core sampling method and lift sampling method, are described in paragraphs 7.3 and 7.4, respectively. Both methods are based on the premise that in order for a sample to be representative of the pile, every particle in the pile must have an equal probability of being included in the sample.

6.3 One of the methods, the core sampling method, assumes that the pile can be completely penetrated using a coring tool (i.e., sampling probe or drill rig). On conical shaped piles, the sample is to be taken approximately perpendicular to the surface of the pile, midway between the peak and the base, to the center of the pile. On piles with flattened tops, the sample is to be taken perpendicular to the surface from the top to the bottom of the pile.

6.4 The other stockpile sampling method, the lift sampling method, assumes that the pile can not be completely penetrated with a sampling tool, and therefore must be sampled either as the soil is placed in lifts onto the pile or before the soil is removed in lifts for use. The samples will, therefore, only be representative of the discrete layer of soil that is exposed to the sampling.

6.5. With either sampling method, to identify the areas to be sampled, the pile shall always be faced looking north. For flat topped piles, divide the stockpile into an imaginary grid with square or rectangular shaped sections approximately equal in area; the grids on flat topped piles should be numbered from left to right, top to bottom. For conical shaped piles, divide the stockpile into an imaginary grid with pie shaped sections of equal areas; the grids on conical shaped piles should be numbered in clockwise pattern.

6.6. Determine the initial number of grids and samples as follows:

Pile Size (cubic yards)	Number of Grids	Number of Lift Samples[1]	Number of Core Samples[2]
< 50	3	3	3
50 to 100	5	5	5
101 to 500 .	6	5	6
500 to 1,000	7	5	7
1,000 to 2,000	8	6	8

Pile Size (cubic yards)	Number of Grids	Number of Lift Samples[1]	Number of Core Samples[2]
2,000 to 4,000	9	6	9
4,000 to 6,000	10	7	10
6,000 to 8,000	11	7	11
8,000 to 10,000	13	8	13
10,000 to 20,000	16	8	16
20,000 to 40,000	20	10	20
40,000 to 70,000	30	15	30
70,000 to 100,000	36	15	36
100,000 to --[3]	36+	15+	36+

Notes:

1 Take one sample from each grid randomly chosen. In order to choose the grids to be sampled randomly, use some blank sample identification tags and number the tags from one (1) to (n), where (n) represents the number of grids in each pile. Put the tags into a sample bag, shake the bag and reach in and blindly select a tag. Continue selecting tags until the required number of grids are selected. The numbers will be chosen without replacement, that is, without returning the used number to the bag. The samples shall be taken from the grids that correspond to the randomly chosen numbers. An alternative method would be to use a computer generated random numbering system available in various spreadsheet programs (i.e., Excel).

2 From the randomly chosen grids, take one composite sample for approximately every ten (10) feet of soil depth to obtain the required number of samples. For example: if a 98 cubic yard pile is 10 feet high, according to the above table, five (5) composite samples are required (i.e., one for each grid). If an 11,000 cubic yard pile is 30 feet deep, three composite samples, one composite sample at each ten feet of depth, will be taken from 5 of the grids and one composite sample will be taken from a sixth, randomly chosen grid.

3 Add one sample for each additional 10,000 cubic yards.

6.7 Take the sample and submit it to the laboratory for analysis.

6.8. Statistically test the results of the sample analyses to determine how much uniformity the samples show and whether more samples must be taken.

6.9. If necessary, take additional samples and analyze. Continue to repeat steps 6.7 arid 6.8 until there are enough samples to characterize the pile.

6.10. As directed by the Field Team Leader, identify materials suitable for backfill or other purpose for which the sampling was done.

6.11. To compare the sample data with the desired criteria, calculate the average (X bar of all the samples) in the pile using:

$$\bar{x} = \frac{1}{n}\sum_{i=1}^{n} xi$$

6.12 If the average satisfies the desired criteria, the results can be further evaluated to determine whether the data provide a 95 percent confidence level that the true mean (μ) meets the relevant criteria. The Field Team Leader will consult with the Project Coordinator to determine if this further evaluation is required.

7.0 IN-SITU SOIL SAMPLING

This section describes the methods for choosing sample locations and sampling methods.

7.1 Sample Location Selection

Appropriate in-situ soil sample locations are determined by the size and uniformity of the deposit being sampled. The sampling pattern depends upon the size of the area, the uniformity of the soil stratum being sampled, and the volume of soil that is being sampled.

Sampling plans for particular purposes may specify a pre-established sampling frequency in terms of the maximum volume of soil represented by a sample. If the soil being sampled is statistically homogeneous, then the locations for samples can be selected randomly over the area and thickness of the deposit. If the soil is not statistically homogeneous, then the area must be broken into sub-areas within which the soils are statistically homogeneous, and each area sampled separately. The issue of statistical homogeneity is resolved by comparing the range of variation of the property being judged to the acceptability criteria. For example, a deposit of sand and gravel may be statistically homogeneous when judged against a standard that the material not contain boulders and not be homogeneous when judged against a standard that no gravels be larger than one inch.

Clearly, also, the number of samples required to resolve the second comparison may be larger than the number required to resolve the first. The sampling frequencies given in the Sections 10.3 and 10.4 (Stockpile Sampling) may be used as a guide in estimating an initial number of samples, but the actual number required for a particular purpose depends very strongly upon the requirements and materials being sampled.

7.2 Drilling Procedures

No drilling is planned.

8.0 OPERATIONAL SUPPORT SAMPLING

Sampling may be required to support the excavation and restoration action. This sampling may be performed in instances when the Field Team Leader is interested in the significance of an observed variation or when looking for cursory information to provide operational guidance. The choice of the method will, therefore, depend on the specific goals of the sampling activity as determined by the Field Team Leader. This sampling is not a quality activity, and may be performed outside the requirements of this procedure. However, all deviations requested by the Field Team Leader must be documented in the Field Logbook by field personnel.

The sampling technique for surface sampling, subsurface sampling, and stockpile sampling, as described in this procedure, shall be used when sampling in these instances.

9.0 SAMPLE TRACKING

To establish the documentation necessary to track the sample from the time of collection, the sample identification and Sample Tracking Forms must accompany samples that are sent to the laboratory.

All potentially contaminated samples to be submitted to the laboratory will be screened for radiation in the field. Information obtained from this survey will be documented on the Sample Tracking Form (Form SOP 214-1). Samples taken from potential borrow areas generally are not screened.

10.0 SAMPLING METHODS

10.1 Surface Soil Sampling

10.1.1. If necessary, to minimize contamination, spread a clean sheet of plastic next to the area to be sampled; assemble the sampling equipment required.

10.1.2. Enter the complete information on the Sample Tracking Form:

- Sample Number
- Sample Matrix
- Sample Location
- Purpose of Sample Collection
- Include applicable comments regarding the sample, location, weather, conditions, or other factors that may be relevant
- Collected by (your name)

10.1.3. Mark the collection bag or prepare the identification tag for the sample.

10.1.4 Collect the soil samples that are representative of the soil in the area surveyed. Use a shovel or trowel to collect soil from the depth required.

10.1.5 Remove rocks, sticks, and foreign objects greater than approximately one-quarter (1/4) inch.

Stir and homogenize the soil in a bucket as much as practicable. Using the hand trowel, randomly scoop the soil from the bucket. Saving each of the scoops of material to collect the required sample size; return the other material to the sampling locations.

10.1.6 Attach the identification tag to the sample bag if appropriate and place the bag in the sample container.

10.1.7 Decontaminate the sampling equipment as required by Section 11.

10.1.8 Return any location markers (such as pin flags) that, were removed in order to sample. Fill in all sampling holes to eliminate a possible tripping hazard.

10.1.9 If specific data are not available, mark a pin flag with the sample identification number and place the flag at the center of the sampling location before leaving.

10.2 Subsurface Sampling (Undisturbed Soils)

10.2.1 If necessary, to minimize contamination, spread a clean sheet of plastic next to the area to be sampled; assemble the sampling equipment required.

10.2.2 Enter the complete information on the Sample Tracking Form

- Sample Number
- Sample Matrix
- Sample Location
- Purpose of Sample Collection
- Include applicable comments regarding the sample, location, weather, conditions, or other factors that may be relevant
- Collected by (your name)

10.2.3 Mark the collection bag or prepare the identification tag for the sample.

10.2.4 Sample the material using a hand core sampling tool or hammer driven split spoon sampler.

Alternatively, an auger method may be used.

Cut a hole, approximately six (6) inches in diameter, in the center of a plastic sheet. Center the sheet of plastic over the area to be sampled. Using an auger, drill through the hole in the plastic to the desired sampling depth; keep the auger turning until no more material comes up. The soil around the hole, on the plastic sheet, is fairly well mixed and representative of the interval just drilled.

If the soil sample is to be obtained from a particular depth (not a composite from surface to depth), and the material refuses to pass into the coring tool, the following sampling method will be performed. Drill through the hole in the plastic to the top of the desired sampling depth; keep the auger turning until no more material comes up. Remove the auger and sample the material using a hand core sampling tool or hammer driven spilt spoon sampler. The few inches of the sample obtained may constitute sidewall slough and should not be part of the desired sample. The sample(s) should be collected over six-inch intervals starting below the slough material.

NOTE: If, due to the conditions of the sampling area, this method does not work, an alternative method(s), approved by the Field Team Leader, may be used. Alternative methods, when used, will be documented by the field personnel in the Field Logbook.

10.2.5 Remove rocks, sticks, and foreign objects greater than approximately one-quarter (1/4) inch in diameter.

NOTE: The removed rocks will be collected and submitted as a separate sample.

10.2.6 Using a hand trowel, collect approximately one (1) quart of the augured soil in the plastic sample bag or jar. For core segments, place each 6-9 inch (nominally 5-7 inch) segment in the plastic sample bag or jar.

10.2.7 Label the sample container.

10.2.8 Return unused material to the sampling hole and fill in the hole to eliminate possible tripping hazard.

10.2.9 Decontaminate the sampling equipment as required by Section 11.

10.2.10 When required, mark a pin flag with the sample identification number and place the flag at the center of the sampling location before leaving.

10.3 Stockpile Sampling (Core Sampling Method)

10.3.1 If necessary, to minimize contamination, spread a clean sheet of plastic next to the area to be sampled and assemble the sampling equipment required.

10.3.2 Enter the complete information on the Sample Tracking Form:

- Sample Number
- Sample Matrix
- Sample Location
- Purpose of Sample Collection
- Include applicable comments regarding the sample, location, weather, conditions, or other factors that may be relevant. Identify the approximate size of the stockpile. (A 70 cubic yard pile of soil is approximately ten feet high with a base diameter of

approximately 26 feet.) Include a brief description of the equipment used to obtain the sample (i.e., sub-soil sampler, drill rig, etc.).
- Collected by (your name)

10.3.3 Before sampling, determine the number of grids and samples as described in Section 6.6. Record the information in the Field Logbook.

10.3.4 Mark the collection bag or prepare the identification tags for the samples.

10.3.5 Using an auger or other coring tool, take the required number of samples from the pile. A hollow stem auger will be used when discrete, rather than composite, samples are collected.

10.3.6 Place the sample material in the sample bag and attach the identification tags. Place the sample bag in the container.

10.3.7 Decontaminate the sampling equipment as required by Section 11.

10.4 Stockpile Sampling (Lift Sampling Method)

10.4.1 If necessary, to minimize contamination, spread a clean sheet of plastic next to the area to be sampled and assemble the sampling equipment required.

10.4.2 Enter the complete information on the Sample Tracking Form:

- Sample Number
- Sample Matrix
- Sample Location
- Purpose of Sample Collection
- Include applicable comments regarding the sample, location, weather, conditions, or other factors that may be relevant. Identify the approximate size of the stockpile. (A 70 cubic yard pile of soil is approximately ten feet high with a base diameter of approximately 26 feet.) Include a brief description of the equipment used to obtain the sample (i.e., sub-soil sampler, drill rig, etc.).
- Collected by (your name)

10.4.3 Before sampling, determine the number of grids and samples as described in Section 6.6. Record the information in the Field Logbook.

10.4.4 Mark the collection bag or prepare the identification tags for the samples.

10.4.5 Using the appropriate sampling tool, take the required number of samples from the lift approximately perpendicular to the surface of the lift at the appropriate locations. Composite the sample through the entire lift thickness.

10.4.6 Place the sample material in the sample bag and attach the identification tags. Place the sample bag in the container.

10.4.7 Decontaminate the sampling equipment as required by Section 11.

10.5 Soil Sample Size

10.5.1 Samples collected for NUTRANL analysis used for EPA confirmation shall consist of a batch of five 20 milliliter bottles of soil. If split samples are to be obtained, approximately 1.5 liters shall be collected. Sample size requirements are detailed in Sample Preparation Procedure for Gamma Spectral Analysis (SOP-364).

11.0 EQUIPMENT CLEANING

To avoid cross-contamination, the sampling equipment will be cleaned prior to and between samples. The following steps will be followed to clean equipment.

- Remove loose contamination by gently tapping/shaking the item.
- Using the stainless steel brush or paper towels, remove material that did not dislodge.
- If the item appears to be clean (i.e., no visible clinging soil), proceed to the next sampling area.
- If the item does not appear to be clean or if a survey with the appropriate instrument does not verify that it is, scrub the item with water. While holding the item over the sampling location, rinse the item with water.
- Dry the item with paper towels or repeat the scrubbing sequence as necessary.
- Rinse gloved hands. Change gloves when changing sampling areas if a self-frisking indicates that contamination is present after rinsing.
- Approximately one percent of the time, swipe the item as described in the Gamma Radiological Survey SOP (SOP-210). Submit the swipes to the laboratory for analysis to confirm the effectiveness of the decontamination protocol. (This step is necessary only when sampling soils where radiologic contamination is suspected.)
- Dispose of cleaning materials, plastic sheeting, and gloves as contaminated materials in accordance with instructions provided by the Field Team Leader.

12.0 QUALITY CONTROL

12.1 Quality Control Samples

To evaluate the variance in the soil sampling protocol, field duplicates will be collected at specified intervals. These quality control (QC) samples will be identified and noted in the Field Logbook.

To validate the sampling protocol used for surface sampling, initially one (1) area on every twenty (20) sub-grids sampled.

For surface sampling, the duplicates shall be randomly selected and identified before sampling activities begin. The duplicate sample material will be collected using the next scoop full of material each time the initial sample is saved.

For subsurface samples, one duplicate subsurface sample will be taken for every twenty (20) samples.

For subsurface sampling, the duplicate will be collected from the representative augered material.

For stockpiles, one duplicate will be taken for every twenty (20) stockpile samples, or one each day that stockpile sampling takes place, whichever is greater.

The stockpile duplicate will be taken from the node of two grids. The duplicates will be randomly selected and identified before the sampling begins.

The Field Team Leader will calculate the mean and the standard deviation for the samples analyzed. If the duplicate sample results are within three (3) standard deviations of the sample population, the sampling protocols can be considered acceptable.

If the Project Coordinator approves, the Field Team Leader can reduce the frequency of the QC duplicate sampling based on the results obtained. Changes shall be documented in the Field Logbook.

12.2 Data Review

Entries in the Field Logbook will conform to the Field Logbook Standard Operating Procedures.

Daily, the Field Team Leader will review the Field Logbook, resolve any discrepancies that were noted by field personnel, and sign the book to indicate the pages reviewed. If the Field Team Leader recorded the discrepancy, the Quality Assurance Supervisor will review the Field Logbook and resolve any discrepancies that were noted.

NOTE: Discrepancies relating to reported data will be brought to the attention of the Field Team Leader.

13.0 HEALTH AND SAFETY

Personal protective equipment and clothing, as required by the Health and Safety Plan, will be used when collecting and handling contaminated soils.

The site radiological conditions will be determined and documented before sampling begins. During the sampling process, the principles of As Low As Reasonably Achievable (ALARA) will be followed.

14.0 RECORDS

The following documents will be maintained as quality records:

- Field Logbooks
- Sampling Tracking Forms
- Results of all Calculations and Statistical Analyses Performed

FORM SOP-214-1

SAMPLE TRACKING FORM

Date: _____ Page _____ of _____

Sample Number	Matrix (S/W)	Location	Collected For	Comments	Collected By
Released by/company			All samples listed above are hereby released except for:		Date/Time
Received by/Company			All samples listed are hereby received except for:		Date/Time
Received by/Company			Data for all samples listed above are hereby received except for:		Date/Time

FORM SOP-214-2

FIELD SAMPLE SCREENING FORM

Sample Type:	Sample ID Number:
Date:	Time:
Counting Instrument:	Sample Date:
Reading Units:	
Signature of Technician:	Date:
Signature of Reviewer:	Date:

AECOM

211 EAST GRAND AVENUE
CHICAGO, IL

STANDARD OPERATING PROCEDURE

Title: Field Logbook Procedure

Document: SOP-215

Revision Number: 0

Date: November 5, 2010

Replaces: New

FIELD LOGBOOK PROCEDURE

1.0 PURPOSE

This procedure describes standard protocol for the use and control of the Field Logbooks used during the Site remediation.

2.0 SCOPE

This procedure applies to field activities that are associated with the Site cleanup.

3.0 REFERENCES

None

4.0 EQUIPMENT AND MATERIALS

Field Logbook.

Indelible pen or pencil.

5.0 INSTRUCTIONS

5.1 Field Logbook Format

5.1.1 Prior to entering the field, page numbers shall be assigned to the pages of the Field Logbook. Pages shall include the date. Each Field Team Leader and other field personnel taking measurements, observing tests, or performing other related work, will be issued a Field Logbook.

5.1.2 The first set of pages for a day will include the following items (in the order indicated):

- personnel on-site
- contractor personnel on-site (names of employees for the companies represented)
- others on-site (e.g., regulators, visitors)
- weather
- equipment used
- equipment calibration
- sketch of work area
- summary of work.

5.1.3 The remaining pages for a day will record the field activities and should include the following:

- meetings (meeting attendees, person who called the meeting, time, location, decisions, and decision makers)
- start and end time of activities.
- visits by others
- regulator - directed activities
- comments made by regulator, visitor, or other persons visiting Site
- weather and working conditions
- general description of work area.
- sketch work areas and show significant relative locations, etc.
- progression of work (e.g., faster or slower, reason for delays)

- description of equipment used, including general name, brand name, model number and, calibration
- description of amount of material excavated and levels of contamination observed (if known)

5.2 Quality Control

5.2.1 The Field Team Leader, or his designee, will review field logbook for completeness, proper field note correction (single line strikeout), and content.

5.2.2 Field logbooks will be audited at the discretion of the Project Quality Assurance Manager.

AECOM

211 EAST GRAND AVENUE
CHICAGO, IL

STANDARD OPERATING PROCEDURE

Title: Excavation Procedure

Document: SOP-217

Revision Number: 0

Date: November 5, 2010

Replaces: New

EXCAVATION PROCEDURE

1. PURPOSE

To provide a procedure for excavation for the Site.

2. SCOPE

This procedure will cover Site excavation activities, which are deemed quality critical by the Project Coordinator

3. REFERENCES

1992, NUREG/CR-5849, Manual for Conducting Radiological Surveys in Support of License Termination, Draft Report.

4. EQUIPMENT AND MATERIAL

None

5. INSTRUCTIONS

5.1 Delineation of extent

5.1.1 Delineate initial areas and depths. Areas and depths will extend slightly beyond estimated extent of impacted soil. Initial areal extent will be established using previously completed walkover gamma surveys, down-hole exploration and sampling information, supplemented with gamma survey data.

5.1.2 Initial excavation limits to be within three inches of the estimated bottom limit.

5.2 Excavate delineated soil mass.

5.3 Sampling scheme

5.3.1 Re-establish survey grid.

5.3.1 Locate diagonals across grid square.

5.3.2 Survey the bottom of the excavation as described in SOP-210.

5.4 Pre-Verification or Verification Sampling

5.4.1 If all measurements within a grid are less than the cleanup criteria limit, then grid is clean. No further excavation is required in this grid.

5.4.2 If any measurements within an excavation are greater than the action criteria limit, then additional excavation is required.

5.4.2.1 Proceed through sequence 5.2 through 5.4 again.

5.4.2.2 Mark subareas around grid points that exceeded the action limit.

5.4.2.2 Contact Field Team Leader for guidance of additional excavation.

5.5 Completion

5.5.1 After grid has met criteria, give documentation of delineation, excavation, and sampling to Field Team Leader.

5.5.2 Grid is available for Pre-Verification or Verification Surveying.

6. QUALITY CONTROL

6.1 Quality control for the excavation documentation will be in accordance with applicable SOPs.

AECOM

211 EAST GRAND AVENUE
CHICAGO, IL

STANDARD OPERATING PROCEDURE

Title: Verification Survey

Document: SOP-223

Revision Number: 1

Date: December 8, 2010

Replaces: Revision 0

VERIFICATION SURVEY PROCEDURE

1.0 PURPOSE

The purpose of this procedure is to present protocol for conducting verification surveys at the excavations at the Site.

2.0 SCOPE

This procedure applies to all completed excavations that are done as a result of the excavation area being identified as containing soil exceeding the cleanup criteria.

3.0 REFERENCES

SOP-210 - Gamma Radiological Survey

4.0 EQUIPMENT AND MATERIALS

None

5.0 PROCEDURE

5.1 Equipment and Materials

Equipment used for verification survey may include the following:

5.1.1 Compass or theodolite

5.1.2 Cloth or steel tape

5.1.3 Stakes, survey flags, or spray paint

5.2 Grid Layout

5.2.1 A confirmation/pre-verification and verification survey may be conducted at remediated excavations.

5.2.2 The grid size (10-meter X 10-meter or less) and locations used for the confirmation/pre-verification surveys will be essentially identical to those that will be established for the verification survey.

5.2.3 The diagonals across each grid square will be located.

5.2.4 The location halfway between the grid corner and the center of the grid will be located (Basically, the center of the four individual 5-meter X 5-meter quadrants.)

5.3 Confirmation/Pre-verification Sampling

5.3.1 Gamma field measurements will be made according to the procedures described for Gamma Radiological Surveys (SOP-210).

5.3.2 When all measurements within a grid are believed to be less than the cleanup criteria limit, then grid is considered clean and a confirmation sample can be collected. If any field measurements within an excavation are greater than the action criteria limit, then the Field Team Leader shall guide additional soil removal until the excavation measures below the cleanup criteria and a confirmation sample can be collected and analyzed.

5.3.3 Sample Collection

5.3.3.1 The confirmation/pre-verification sample will be a composite sample made up of five subsamples obtained by dividing the 100 m^2 area into four equal quadrants of 5-meter X 5-meter. Four of the subsamples will be collected from the center of the individual 5-meter X 5-meter quadrants, while the fifth subsample will be collected from the center of the 10 meter x 10 meter (or less) verification unit.

5.3.3.2 The material from the five sample aliquots will sifted through a 1/4" sieve to remove rocks, sticks, and other debris greater than 1/4" in size, then combined and homogenized in a stainless steel bowl.

5.3.3.3 Following homogenization, a properly sized aliquot of the homogenized material will be placed in an appropriate sample container(s): 20ml for NUTRANL sample analysis or 500-ml for high resolution gamma spectroscopy analysis.

Note: Only one sample is being prepared for the confirmation/pre-verification NUTRANL analyses, versus the analysis of five samples for verification sample analysis.

5.3.4 Sample Analysis

5.3.4.1 This sample will then be analyzed using NUTRANL or high resolution gamma spectroscopy analysis.

5.3.4.2 If the composite sample analysis results indicate a combined Ra-226/Ra-228 concentration of less than 7.1 pCi/g, AECOM will contact the USEPA and request USEPA conduct the collection of a verification sample.

5.4 Verification Sampling

A verification sample shall be collected once gamma surveying and the confirmation/pre-verification sampling indicates that the base of excavation area is less than 7.1 pCi/g. Verification sampling will be conducted by the USEPA for each verification area not to exceed 100 m^2 (10 meter by 10 meter or less, square in shape or at least reasonably close).

5.4.1 Sample Collection

5.4.1.1 The verification sample will be comprised of a five point composite sample with individual sample aliquots collected from the diagonals and center point of the roughly 10 meter x 10 meter (or less) verification unit.

5.4.1.2 Diagonals will be established through each corner and intersecting at the center.

5.4.1.3 A total of five sample aliquots will be collected from each verification unit:

a. Four sample aliquots will be collected from the midpoint of each diagonal between a corner and the center.

b. One sample aliquot will be collected from the center of each verification unit.

c. Each sample aliquot volume should be at least 500-ml or of sufficient size to ensure there is enough material for a 500-ml sample following 1/4" screening.

5.4.1.4 The material from the five sample aliquots will sifted through a 1/4" sieve to remove rocks, sticks, and other debris greater than 1/4" in size, then combined and homogenized in a stainless steel bowl.

5.4.1.5 Following homogenization, a properly sized aliquot of the homogenized material will be placed in an appropriate sample container: 100-ml for NUTRANL analysis (20ml for each of five NUTRANL sample containers), or 500-ml for high resolution gamma spectroscopy analysis.

5.4.2 Verification Sample Analysis

5.4.2.1 The five individual verification samples will then be analyzed using NUTRANL or a single sample utilizing high resolution gamma spectroscopy analysis.

5.4.2.2 If verification sample analysis results indicate a combined Ra-226/Ra-228 concentration of less than 7.1 pCi/g, AECOM will provide to USEPA a "Notification of Successful Pre-Verification or Verification" form for the verification unit and request a final verification survey or approval to backfill.

5.4.2.3 Upon request by the USEPA, the verification sample will be shipped to the USEPA National Air and Radiation Environmental Laboratory for final high resolution gamma spectroscopy analysis.

6.0 DOCUMENTATION

6.1 A scale drawing of the survey area showing the locations and results of the gamma measurements will be created.

6.2 The drawing and gamma measurements will be delivered to the USEPA with a Notice of Successful Verification and a request for approval to backfill the excavation (Form SOP 223-1).

7.0 QUALITY CONTROL

7.1 Quality control for the verification documentation will be in accordance with applicable SOPs.

For each verification unit of 100 square meters or less (an area with dimensions of 10 meters by 10 meters or less, square in shape or at least reasonably close):

1. Once gamma surveying indicates that the base of excavations are likely less than 7.1 pCi/g, a verification sample shall be collected.
2. The verification sample will be comprised of a 5 point composite sample with individual sample aliquots collected from the diagonals and center point of the roughly 10 meter x 10 meter (or less) verification unit.
3. Diagonals will be established through each corner and intersecting at the center.
4. A total of five sample aliquots will be collected from each verification unit:
    a. Four sample aliquots will be collected from the midpoint of each diagonal between a corner and the center.
    b. One sample aliquot will be collected from the center of each verification unit.
    c. Each sample aliquot volume should be at least 500-ml or of sufficient size to ensure there is enough material for a 500-ml sample following 1/4" screening.

5. The material from the five sample aliquots will sifted through a 1/4" sieve to remove rocks, sticks, and other debris greater than 1/4" in size, then combined and homogenized in a stainless steel bowl.

6. Following homogenization, a properly sized aliquot of the homogenized material will be placed in an appropriate sample container: 100-ml for NUTRANL analysis (20ml for each of five NUTRANL sample containers), or 500-ml for high resolution gamma spectroscopy analysis.

7. This verification sample will then be analyzed by AECOM using NUTRANL or high resolution gamma spectroscopy analysis.

8. If verification sample analysis results indicate a combined Ra-226/Ra-228 concentration of less than 7.1 pCi/g, AECOM will provide to U.S. EPA a "Notification of Successful Pre-Verification or Verification" form for the verification unit and request a final verification survey or approval to backfill.

9. AECOM will then ship the verification sample to the U.S. EPA National Air and Radiation Environmental Laboratory for final high resolution gamma spectroscopy analysis.

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: _____

Date of Verification Survey: _____

Time of Verification Survey _____ am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the USEPA.

Signed: _____

Date: _____

Print Name Steve Kornder _____

Print Title Senior Project Geochemist _____

AECOM

The attached Verification Survey documents were reviewed by USEPA, Region 5 on _____. The results of this survey indicate that the verification criteria as contained in the Administrative Settlement Agreement and Order on Consent.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Date _____

Print Name _____

Print Title _____

For USEPA Region 5

AECOM

211 EAST GRAND AVENUE
CHICAGO, IL

STANDARD OPERATING PROCEDURE

Title: Operation of Ludlum Model 2221 Scaler/Ratemeter with Ludlum Model 44-10 2"x2" NaI Scintillation Probe

Document: SOP-343

Revision Number: 0

Date: November 5, 2010

Replaces: New

Operation of Ludlum Model 2221 Scaler/Ratemeter with Ludlum Model 44-10 2"x2" Nal Scintillation Probe

1.0 SCOPE

1.1 Purpose

The Ludlum Model 2221 Scaler/Ratemeter with Ludlum Model 44-10 2"x2" Scintillation Probe is used to perform gamma radiological screening surveys over soil surfaces. In addition to screening surveys, the instrument can collect integrated count rate data at fixed locations

1.2 Applicability

The Ludlum Model 2221 Scaler/Ratemeter with Ludlum Model 44-10 2"x2" Scintillation Probe is used to perform gamma radiological screening in accordance with SOP 210 "Gamma Radiological Screening Surveys".

2.0 REFERENCES

2.1 Ludlum Model 2221 Scaler/Ratemeter Operation Manual

3.0 EQUIPMENT AND MATERIALS

The following equipment may be used as part of the survey programs. Other equipment may be substituted if necessary because of availability of the items listed or the conditions encountered at the site.

- Ludlum Model 2221 Scaler/Ratemeter
- Ludlum Model 44-10 2"x2" Nal Scintillation Detector
- NIST Traceable Radiation Check Source

4.0 PROCEDURE

4.1 Check for Current Calibration Sticker

4.1.1 Survey Meter shall be calibrated within the last 12 months and be affixed with a current calibration sticker. Meter shall be calibrated according to manufacturer's instructions with appropriate NIST traceable sources.

4.2 Check Batteries

4.2.1 Press the "BAT" button

4.2.2 The digital readout should read greater than "5.0". Record result on "Daily Radiation Survey Instrument Function Check" form (see Attachment 1).

4.2.3 Replace 4 D batteries if needed before use.

4.3 Verify Background

4.3.1 Set control switch to "DIG RATE".

4.3.2 Go to an area away from Exclusion Zone or where radioactive contamination is not present. Record result on "Daily Radiation Survey Instrument Function Check" form (see Attachment 1).

4.3.3 Site Specific background count rates shall be established for each instrument prior to initiating excavation activities.

4.3.4 Compare the observed count rate to the pre-established background count rate.

4.3.5 Do not use the meter if the observed count rate varies greater than +/- 10% from the pre-established background count rate unless it can be established appropriately why background conditions have changed.

4.4 Perform Meter Operation Check

4.4.1 Set control switch to "SCALER"

4.4.2 On the calibration sticker the operation check value will be noted and the survey configuration required to perform the check.

4.4.3 Place detector probe on top of the check source holder.

4.4.4 Press "Count" to collect a one minute integrated count.

4.4.5 Record operational check reading indicated on the digital readout. Record result on "Daily Radiation Survey Instrument Function Check" form (see Attachment 1).

4.4.6 Observed reading should be within +/- 10% of recorded operational check value.

4.4.7 Do not use the meter if the operational check fall outside of the acceptable range

4.5 Performing Radiation Surveys

4.5.1 Set Control switch to "DIG RATE"

4.5.2 Hold the probe at a consistent height no further than 6 inches away from surface being surveyed

4.5.3 Move the probe slowly over the surface being surveys at a rate of no more than 0.5 meter per second.

4.5.4 Walk over survey area with spacing between passes not to exceed 1 meter.

4.5.5 Record count rates, as needed.

5.0 RECORDS/REPORTS/NOTIFICATIONS

Refer to SOP-210 for documentation required when performing Gamma Radiological Screening Surveys.

ATTACHMENT 1

LUDLUM MODEL 2221 DAILY RADIATION SURVEY INSTRUMENTATION FUNCTION CHECK

Instrument Serial Number: _____

Probe Model Number: _____

Probe Serial Number: _____

Check Source ID Number: _____

Acceptable Source Count Rate (+/- 10%): _____

Acceptable Background Count Rate (+/- 10%): _____

Date	Time	Physical Check	Battery Check	Background Counts (CPM)	Source Counts (CPM)	Performed By (Initials)

AECOM

211 EAST GRAND AVENUE
CHICAGO, IL

STANDARD OPERATING PROCEDURE

Title: Surveys for Surface Contamination and Release of Equipment for Unrestricted Use

Document: SOP-345

Revision Number: 0

Date: November 5, 2010

Replaces: New

SURVEYS FOR SURFACE CONTAMINATION AND RELEASE OF EQUIPMENT FOR UNRESTRICTED USE

1.0 SCOPE

1.1 Purpose

This procedure provides the methods for the detection and measurement of radioactive contamination within the site areas, it provides the methods for evaluating contamination, and establishes the criteria for releasing equipment or materials out of the Exclusion Zone. These methods are to be used to minimize the spread of radioactive contamination.

1.2 Applicability

This procedure applies to surveys that are performed on building surfaces, vehicles, equipment, materials (herein referred to as equipment) at the site and to the site personnel, who are required to monitor and release the equipment.

2.0 REFERENCES

2.1 10 CFR Part 20 Standards for Protection Against Radiation

2.2 U. S. Nuclear Regulatory Commission (USNRC) Regulatory Guide 1.86

2.3 Health and Safety Plan for radiologically impacted soil removal, Rehabilitation Institute of Chicago

2.4 NUREG CR5849 Manual for Conducting Radiological Surveys in Support of License Termination

3.0 DEFINITIONS

3.1 Beta-Gamma to Alpha Decay Ratio

A thorium-232 decay series produces about 0.5 beta-gamma decays for every one alpha decay. This ratio allows the limits for alpha contamination to be verified using beta-gamma survey instruments.

3.2 Clean Area

This term defines radiation conditions within a specified area. An area where the radiation levels and contamination levels are maintained below 2 mrem/hr and 33 dpm/100 cm^2 alpha respectively.
Contamination Surveys

An assessment that may include, as appropriate, surveys for loose and fixed contamination through the use of direct frisks, large area wipes and smears, to locate and quantify the radioactive material present.

3.4 Exclusion Zone

The area on one side of the Control Line that includes Contamination Control Areas, Radiation Areas, and Airborne Radioactivity Areas.

3.5 Large Area Wipes (LAWs)

Paper towels or muslin used to wipe large areas to identify the presence of loose contamination.

3.6 Lower Limit of Detection (LLD)

The smallest amount of a radionuclide in a sample that will be detected with a probability of non-detection (Type 1 error) while accepting a probability of erroneously detecting that radionuclide in a blank sample (Type II error). These probabilities are 0.05 (5% chance of Type I or II errors). See Attachment 5 - "LLD Calculation" sheet.

3.7 Smears

Typically 2 inch disk type paper material. Smears are normally taken to identify and quantify loose contamination.

3.8 Unrestricted Release

Release of equipment or materials from the Exclusion Zone to any destination other than a licensed facility.

4.0 REQUIREMENTS

4.1 Prerequisites

4.1.1 Health Physics personnel shall ensure that all portable survey equipment used for this procedure are properly functioning and have a valid calibration sticker.

4.1.2 The Health Physics Supervisor or designee shall ensure that all personnel who are required to perform this procedure are properly trained and understand this procedure.

4.1.3 Equipment, vehicles and areas should be free of visible dirt, mud or dust prior to performing a contamination survey.

4.2 Tools, Material, Equipment

4.2.1 The following counting equipment, or their equivalents, should be used for performing contamination surveys on equipment and materials:

- Personnel and Equipment Frisking: Ludlum Model 3 Survey Meter with attached pancake G-M probe

- Alpha Smear Counting: Ludlum 2200 Scaler with attached Model 43-10 Alpha Scintillation Counter

4.2.2 Survey Maps (or lists) should be produced for each applicable type of equipment. Sketches of building surfaces (walls, floors, etc.), identifying the surveyed grids, should be produced for each surveyed building.

4.3 Precautions, Limits

4.3.1 Direct and removable surveys should not be performed on wet surfaces for alpha contamination. Wet surfaces should be surveyed only for beta-gamma contamination. However, the Health Physics Supervisor shall make the final determination as to when a wet surface is to be surveyed.

4.4 Acceptance Criteria

4.4.1 Prior to unrestricted release from the Exclusion Zone, all vehicles, equipment and materials shall be surveyed for contamination. If contamination is found, then the vehicle, equipment, or material should be decontaminated in order to be within the applicable

surface contamination release limits per Attachment 3 and Attachment 6 (Beta-Gamma Survey of Truck Tires) shall be used as a guideline for meeting Department of Transportation (49CFR173.443) release criteria, when performing surveys on wet surfaces.

4.4.2 The release of items from clean areas within the Exclusion Zone will be controlled by specific criteria established on a case by case basis and approved by the Health Physics Supervisor.

5.0 PROCEDURE

5.1 Routine Surface Contamination Surveys

5.1.1 Routine surveys shall be performed by trained personnel (typically by Health Physics Technicians), in accordance with this procedure and as scheduled by the Health Physics Supervisor.

5.1.2 Routine contamination surveys are not required in the Exclusion Zone.

5.1.3 Support Zone and Contamination Reduction Zone shall be surveyed at least weekly to ensure that cross contamination is not occurring. The clean side of the Contamination Reduction Zone should be surveyed each work day.

5.1.4 Other surveys will be performed, as appropriate, to support Special Work Permits, the movement of equipment from radioactive material areas to clean areas, and to evaluate radiological conditions in specific work areas when directed by the Health Physics Supervisor.

5.2 Support/ Contamination Reduction Zone- Surface Contamination Surveys

5.2.1 Survey techniques may employ the use of large area wipes, smears, or direct frisks as appropriate to the area being surveyed.

5.2.2. Large area wipes may be used to assess floor areas for contamination. A sufficient number of large area wipes should be used to evaluate approximately 10% of the floor area being surveyed.

5.2.3 If contamination is found with the large area wipes, a more detailed smear survey should be performed.

5.2.4 Counter tops, office furniture, laboratory equipment, etc., should be included in the contamination surveys. The area immediately on the clean side of the Control Line should be included in the survey.

5.2.5 Smears shall cover approximately 100 cm^2 and should focus on areas with the highest potential for removable contamination. The smears should be placed in an envelope that is labeled with a sequential number corresponding to the Smear Number on the Radiological Survey Data Sheet (see Attachment 1).

5.2.6 The smears shall be analyzed for alpha contamination.

5.3 Equipment- Surface Contamination Surveys

5.3.1 Equipment shall be surveyed for contamination by using large area wipes, smears and by direct frisk as appropriate.

5.3.2 Take an appropriate number of smears to adequately assess the radiological conditions of the item being surveyed.

5.3.3 A large area wipe may be used as an indication of the presence of contamination.

5.3.4 Smears shall cover approximately 100 cm^2 and should focus on areas with the highest potential for removable contamination. The smears should be placed in an envelope that is labeled with a sequential number corresponding to the Smear Number on the Radiological Survey Data Sheet (see Attachment 1).

5.3.5 The smears shall be analyzed for alpha contamination.

5.4 Unrestricted Release

5.4.1 Materials, equipment and vehicles shall be surveyed for contamination prior to unrestricted release from the site, using large area wipes, smears, and by direct frisk.

5.4.2 All building surfaces, large concrete pieces, and other materials having large, smooth surfaces shall be surveyed prior to unrestricted release. A sufficient number of large area wipes and/or smears shall be taken to adequately assess any contamination present.

5.4.3 All equipment intended for unrestricted release from contaminated areas shall be surveyed for removable and fixed contamination. A sufficient number of large area wipes and/or smears shall be taken to adequately assess any contamination present. If removable contamination is within the release criteria, then perform a direct alpha frisk. Particular attention should be given to areas of the vehicle most likely to have become contaminated such as tire exterior surfaces, occupied areas, load areas, wheel wells, and the bottom of the equipment.

5.4.4 Vehicles intended for unrestricted release from contaminated areas shall be surveyed for removable contamination with large area wipes. If no contamination is found, take a confirmatory smear to document each large area wipe. If contamination is found, take an appropriate number of smears to evaluate the removable contamination present. If removable contamination is within the release criteria, then perform a direct alpha frisk. All survey results must be documented.

5.4.5 Vehicles intended for unrestricted release from clean areas in the Exclusion Zone shall be surveyed with large area wipes on accessible tire/track surfaces, with a direct frisk of tire/track surfaces, and with one smear each for two tires The results of the direct frisk and the large area wipes must indicate that the release criteria is met. The smears shall be added to the survey documentation when the results become available.

5.4.6 Large area wipes may be used as an indication of the presence of contamination.

5.4.7 If no contamination is found with a large area wipe, a confirmatory smear shall be taken for documentation.

5.4.8 If contamination is found with the large area wipe, a representative number of smears shall be taken to quantify the removable contamination present.

5.4.9 Smears shall cover approximately 100 cm' and should focus on areas with the highest potential for removable contamination. The smears should be placed in an envelope that is labeled with a sequential number corresponding to the Smear Number on the Radiological Survey Data Sheet (see Attachment 1).

5.4.10 The smears shall be transported to the Site Laboratory for analysis.

5.4.11 Perform a direct frisk on all material being surveyed for unrestricted release.

5.4.12 Personal equipment and articles (radios, pens, paper, clipboards, etc.) can be surveyed with either the large area wipes or by direct frisk, as appropriate.

NOTE
Items that have irregular surfaces, such as radios, should be wiped and frisked. Items with relatively smooth surfaces, such as paper, pens, etc., may be direct frisked only.

5.5 Documentation of Results

5.5.1 The smear counting results and data shall be documented on the Radiological Survey Data Sheet (see Attachment 1). The documentation of the release survey shall include a drawing of the item to be released.

5.5.2 The instructions for completion of the Radiological Survey Data Sheet are contained in Attachment 2.

5.5.3 A request for equipment release form (Attachment 7) shall be initiated by the equipment owner to track the decontamination process.

6.0 RECORDS/REPORTS/NOTIFICATIONS

6.1 The Health Physics Supervisor and the Project Coordinator shall review and approve all completed survey forms required by this procedure, to comply with reference 2.5 above.

6.2 The survey maps shall be uniquely numbered and retained by Health Physics for project filing. Single item survey maps shall be attached to the survey results.

7.0 ATTACHMENTS

7.1 Attachment 1 - Radiological Survey Data Sheet (example)

7.2 Attachment 2 - Radiological Survey Data Sheet Instructions

7.3 Attachment 3 - Surface Contamination Release Limits

7.4 Attachment 4 - Large Area Wipes on Truck Tires

7.5 Attachment 5 - LLD Calculation

7.6 Attachment 6 - Beta- Gamma survey of Truck Tires (wet surfaces)

7.7 Attachment 7 - Request For Equipment Release

Attachment 1

RADIOLOGICAL SURVEY DATA SHEET

Page ___ of ___

Item Description	00 ___ Vehicle		98 ___ Equipment		___ Building ___ Other	
Reference	YR	MO	Day	Item	No.	Performed By:
Alpha Survey Instrumentation				Beta Survey Instrumentation		

Location	Smear Number	Alpha Activity (dpm/100cm^2)			Beta Gamma Direct (CPM)
		Direct	Removable	Fixed	

REMARKS

Reviewed By:	Date:

ATTACHMENT 2

RADIOLOGICAL SURVEY DATA SHEET INSTRUCTIONS

1. Select the appropriate survey category.

2. Enter the purpose of the survey in the "ITEM DESCRIPTION" section. Be specific:

   - Vehicle survey for release from the site.
   - Tools and equipment for use in the clean area.
   - S WP support, include the S WP number.

3. Enter the survey date.

4. Enter the reference number - Year, Month, Date, Item (Use coding for categories at the top of the form) and Number.

5. Enter your signature in the "PERFORMED BY" section.

6. Enter the instrument(s), serial number(s), and background reading(s) for the survey instruments used for this survey.

7. Enter the "LOCATION OF READING." Enter descriptions such as, the location and item being surveyed, vehicle number, smear location on vehicle, etc.

8. Enter the number of the smear or large area wipe in the "SMEAR NUMBER" section.

9. All data in the "ALPHA ACTIVITY" section is recorded in dpm/100cmz, except large area wipe data.

   - If equipment/material is directly frisked, the reading from the Ludlum Model 3 with pancake G-M probe is converted to dpm/100cm~ by multiplying ccpm by a factor of 4 (Gross cpm - Background cpm X 4) and enter the result in the "DIRECT" column. If the instrument response cannot be distinguished from background enter <200 dpm/I00cm^2.

   - The "REMOVABLE" column may contain the result from a smear or the result from a large area wipe. Smear results that are less than the LLD shall be recorded as less than the numerical LLD value for the instrument in use. As an example, if the LLD for the 65000 is 3 dpm, then the result will should be recorded as <3 dpm/100cm^2. All results should be rounded to the nearest whole number. Results from LAWs should be recorded as dpm without regard to area, unless specific instructions are given to calculate the result per area, as in Attachment 4. Results that do not exceed background should be recorded as BKG (Background).

   - Fixed contamination is the difference between the direct frisk results and the removable contamination results. If no fixed contamination is detectable, enter N/A in the "FIXED" column.

10. If a "BETA-GAMMA DIRECT" survey is performed, record the results as ccpm.

11. In the "REMARKS" section, record any identifying data on counting equipment and any other information needed for explanation or interpretation of survey data. If large area wipes are included in the removable contamination data without regard to area, note this in the "REMARKS" section.

ATTACHMENT 3

SURFACE CONTAMINATION RELEASE LIMITS

Average[a] Removable (dpm/100 cm^2)	Maximum Removable (dpm/100 cm^2)	Average[a] Fixed (dpm/100 cm^2)	Maximum Fixed (dpm/100 cm^2)
20	100	1,000	5,000
Equivalent Beta-Gamma Measurements [b,c]			
17	50	500	2,500

a The contamination levels may be averaged over one (1) square meter provided the maximum activity per any 100 cm^2 area within the one (1) square meter is less than the maximum applicable release limit.

b Beta-gamma release limits derived from the beta-gamma to alpha ratio.

c Beta-gamma surveys are not normally performed for release purposes. If alpha contamination is verified to be within specified release limits, the alpha to beta-gamma ratio indicates that the beta-gamma is also within limits.

Beta-gamma frisks may be used as appropriate to:

- Estimate contamination levels prior to performing release surveys.
- Estimate levels of contamination present on equipment, materials and work areas.

The results of direct beta-gamma frisks should be quantified on survey records as CCPM (Corrected Counts Per Minute).

Results that are less than 100 CCPM should be recorded on the survey record as <100 CCPM.

ATTACHMENT 4

LARGE AREA WIPES ON TRUCK TIRES

Large area wipes are used to wipe an area of approximately 2000 cm^2 on truck tires. The wipes are then frisked with a PAC-4G.

Assuming that 50 cpm above background is readable, it can be assumed that 100 dpm is detectable on a wipe. If the area of the wipe requires two probe areas to cover the wipe, then it can be assumed that we can assess with each measurement approximately half of the total area wiped, or 1000 cm^2 or approximately 100 dpm/1000 cm^2, which is equivalent to 10 dpm/100cm^2.

Frisk results on LAWs, from truck tires, that are nondetectable may be recorded as <10 dpm/100cm^2 in the removable column of the survey report.

ATTACHMENT 5

LLD CALCULATION

$$LLD = \frac{2.71}{T_s} + 3.29\sqrt{\left(\frac{Cb}{Tb}\right)\left(1+\frac{Tb}{Ts}\right)}$$

Where C_b = Background Counts Per Minute
T_b = Background Counting Time in minutes
T_s = Sample Counting Time in minutes

EXAMPLE: The background count rate for a given counter is 1.56 cpm over a 50 minute counting time and samples are counted for 2 minutes. The counter has an efficiency of 40.3%.

$$LLD = \frac{2.71}{2} + 3.29\sqrt{\left(\frac{1.56}{50}\right)\left(1+\frac{50}{2}\right)}$$

LLD = 4.32 cpm

$$LLD = \frac{4.32 \text{ cpm}}{.403} = 10.7 \text{ dpm}$$

ATTACHMENT 6

BETA-GAMMA SURVEY OF TRUCK TIRES

The Department of Transportation removable contamination limits in 49CFR 173.443 are 220 dpm alpha contamination and 2200 dpm beta contamination. The most restrictive is the alpha limit. If weather prevents surveying for alpha contamination, then beta-gamma surveys will have to be utilized. The alpha to beta ratio for the thorium chain is approximately 2:1. Using an alpha to beta ratio of 2, the beta equivalent activity for the alpha limit would equal 110 dpm. 110 dpm times the probe efficiency of 0.14 cpm/dpm equals 15.7 cpm. 15.7 cpm above background is not discernable in the field. The diameter of a truck tire is 43 inches. The tread width is 9 inches. The surface area of a truck tire equals 7843.8 cm^2. Approximately 12 inches of tread is on the ground and not surveyable. This represents 3.5% of the surface area of the tire. The remaining 96.5% equals a surface area of 7569.5 cm^2. The typical area of contact for a wipe is about 3.5 inches by 4 inches. This is equal to about 90 cm^2. If the conservative area of 100 cm^2 is used the each cm^2 of wipe is equal to 57.7 cm^2 of tread area. The manufacturer lists the surface area of the probe face as 15.5 cm^2. The tread area survey under the probe equals 894.4 cm^2. To correct the measured counts to an activity/100 cm^2 the counts indicated on the meter face must be multiplied by 8.9. If 15.7 cpm/100 cm^2 beta-gamma activity equals 220 dpm/100 cm^2 alpha contamination then the measured cpm when surveying a wipe would equal 139 cpm. The manufacturer recommends limiting the background count rate to less than 300 cpm in order to see 100 cpm above background. Due to the changing background conditions this value is being reduced to 200 cpm. Therefore, if background is 200 cpm or less and the wipe on a truck tire reads less than 100 cpm above background the truck tire has less than 220 dpm/100 cm^2 removable alpha contamination.

ATTACHMENT 7
REQUEST FOR EQUIPMENT RELEASE

From: _____ Date: _____

TO: HEALTH PHYSICS SUPERVISOR

1. Equipment Type and ID # _____

2. Usage History (locations on site)

_____
_____
_____

3. Scheduled Date to Start Decontamination _____

4. HP Check for Survey Readiness: Technician _____ Date _____

5. Equipment ready for survey ☐ YES ☐ NO

Actions required _____
_____
_____

6.Date and Time Ready for Survey _____

7. Survey Date and Time _____

Results: Pass _____ Fail _____

8. Equipment Release Date _____

9.Approved for Release: HP Supervisor: _____ Date: _____

NOTE; On large earth moving equipment, substantial cleaning may be required prior to HP checking for survey readiness. Once vehicle has been checked and is ready for release survey, it may take as much as 24 hours from the time the survey is initiated until survey results are available. If fixed or removal is located, additional decontamination and surveys are required.

AECOM

211 EAST GRAND AVENUE
CHICAGO, IL

STANDARD OPERATING PROCEDURE

Title: Decontamination

Document Number: SOP-347

Revision Number: 0

Date: November 5, 2010

Replaces: New

DECONTAMINATION

1.0 SCOPE

1.1 Purpose

The purpose of this procedure is to provide instructions for the decontamination of personnel and equipment.

1.2 Applicability

This procedure is applicable for all equipment and personnel that may become contaminated at the Parkview West site.

2.0 REFERENCES

10 CFR Parts 19 and 20

U. S. Nuclear Regulatory Commission (USNRC) Regulatory Guide 1.86

Health and Safety Plan, Parcel K and Parcel 21 Radiologically Impacted Soil Removal Action, Chicago, Illinois

SOP-345 "Surveys for Surface Contamination and Release of Equipment for Unrestricted Use"

3.0 DEFINITIONS

3.1 Airborne Radioactivity Area

This term defines radiation conditions within a specified area. An area where the average concentration of airborne radioactivity could allow an individual to exceed 12 DAC-hrs over a one week period.

3.2 Clean Area

This term defines radiation conditions within a specified area. An area where the radiation levels and contamination levels are maintained below 2 mrem/hr and 33 dpm/100 cm^2 alpha respectively.

3.3 Contamination Control Area

This term defines radiation conditions within a specified area. An area that may be contaminated to a level greater than a Clean Area.

3.4 Contamination Reduction Zone

The area on one side of the Control Line where personnel can decontaminate, remove their personal protective clothing and equipment.

3.5 Control Line

The demarcation that separates a Clean Area from a Contamination Control Area. The control line is located in the personnel decon facility.

3.6 Craft Personnel

Employees and contractors who physically perform the activities described on the SWP.

3.7 Derived. Air Concentration-Hour (DAC-hour)

DAC-hour is the product of the concentration of radioactive material in air and the time of exposure to that radionuclide.

3.8 Exclusion Zone

The area on one side of the Control Line that includes Contamination Control Areas, Radiation Areas, and Airborne Radioactivity Areas.

3.9 Film Badge

Similar to the TLD, it is used to measure radiation dose.

3.10 Frisking

A personal survey of an individual's clothing and exposed body performed to determine if contamination is present.

3.11 Protective Clothing

Reusable or disposable coveralls, boots and gloves that provide a barrier between contamination and personnel.

3.12 Radiation Area

This term defines radiation conditions within a specified area. An area where the whole body radiation level is greater than 5 mrem/hr.

3.13 Special Work Permit (SWP)

A document which describes the radiological conditions of the work area or task and delineates safety and radiation protection requirements to be followed in the work area or when performing the task.

3.14 Support Zone

The area on one side of the Control Line at the entrance to the Exclusion Zone.

3.15 Optically Stimulated Luminescence Dosimeter (OSL)

A device that measures radiation dose.

4.0 REQUIREMENTS

4.1 Prerequisites

None.

4.2 Tools, Material, Equipment

4.2.1 Decontamination facility.

4.2.2 Soap, water, high pressure spray, scrub brushes and other material as necessary to decontaminate personnel and equipment.

4.3 Precautions, Limits

Decontamination of personnel with material other than soap and water will only be done when authorized by the Site Manager, Health Physics Supervisor, or a medical doctor.

4.4 Acceptance Criteria

4.4.1 Personnel shall be free of contamination after decontamination.

4.4.2 Material and equipment being decontaminated, for unrestricted release, shall meet the release limits established in Reference 2.4.

5.0 PROCEDURE

5.1 Personnel Decontamination

5.1.1 Personnel who are contaminated to greater than 100 ccpm shall notify the health physics technician (HPT) assigned to the Control Line.

5.1.2 The HPT shall resurvey the individual to determine the exact location of the contamination and document it on the Contaminated Personnel or Personal Effects Report (Attachment 1).

5.1.3 If the contamination is spotty, the HPT shall attempt to decontaminate the individual using swabs or soap and water. If the decontamination is successful, document the results on Attachment 1.

a. If contamination is determined to be in an individual's eyes, the eyes may be flushed, using an eye wash station.

b. If contamination remains in the eyes after flushing or is determined to be in an individual's nose or ears, decontamination will be performed under the direction of the Health Physics Supervisor or qualified medical personnel.

c. Cleansing methods for skin decontamination, in order of harshness are as follows:
   1. Lifting off with sticky tape
   2. Flushing with water
   3. Soap and cool water
   4. Mild abrasive soap, soft brush, and water
   5. Detergent (soap powder)
   6. Mixture 50% powdered detergent and 50% cornmeal

5.1.4 If the contamination cannot be easily removed or the contamination is wide spread, the HPT shall escort the individual to the decontamination facility and notify the Health Physics Supervisor and the Site Manager.

5.1.5 The contamination shall be removed by having the individual wash with soap and cool water several times, if necessary. The methods listed above may be used by the HPT.

5.1.6 If the decontamination is successful, document the results on Attachment 1.

5.1.7 If, after several attempts, the contamination is not successfully removed, notify the Health Physics Supervisor.

5.2 Tool Decontamination

5.2.1 All tools being removed from the Exclusion Zone shall be checked by the HPT.

5.2.2 Tools that are contaminated shall be decontaminated before they can be released from the Exclusion Zone.

5.2.3 Tools shall be decontaminated by the users under the direction of the HPT.

5.2.4 Tools can be decontaminated using scrub brushes and soap and water, wiping with damp rags or wipes, soaking in a decontamination solution, using abrasive materials ultrasonic cleaners, or any other method approved by the HPT.

5.2.5 All interior surfaces of the tools must be decontaminated as well prior to the tool being unconditionally released.

5.2.6 If the tool is decontaminated and released by the HPT, the survey results shall be documented on a Radiological Survey Data Sheet (SOP-345 - Attachment 1)

5.2.7 If the tool cannot be decontaminated after several tries, then the tool shall be painted or sprayed with yellow paint to indicate that the item is radioactive material and kept in the Exclusion Zone.

5.3 Equipment Decontamination

5.3.1 Heavy equipment, such as backhoes, bulldozers, trucks, cranes, shall be washed with high pressure water spray prior to being surveyed by the HPT.

5.3.2 The washing of heavy equipment shall be performed in an area designated by health physics.

5.3.3 Once the equipment is washed, it will be surveyed by the HPT. The HPT will identify any areas on the equipment that need further decontamination and will make recommendations on how to further decontaminate.

5.3.4 All surfaces of the equipment must be decontaminated and surveyed. This includes air intakes, air filters and any internal surface that is likely to be contaminated.

5.3.5 Once the equipment has been surveyed and released by the HPT, the survey results shall be documented on a Radiological Survey Data Sheet (SOP-345 - Attachment 1).

6.0 RECORDS/REPORTS/NOTIFICATIONS

6.1 Release surveys and personnel decontaminations shall be documented on the appropriate form.

6.2 Personal contaminations shall be reported to the Health Physics Supervisor and the Site Manager.

7.0 ATTACHMENTS

7.1 Attachment 1 Contaminated Personnel or Personal Effects Report

ATTACHMENT 1

CONTAMINATED PERSONNEL OR PERSONAL EFFECTS REPORT

DATE OF INCIDENT			TIME OF INCIDENT		
NAME			BADGE NO.		
LOCATION OF INCIDENT (SPECIFIC AREA)					
DESCRIPTION	DESCRIBE IN DETAIL ANATOMICAL LOCATION, CONTAMINANT, TYPE OF INJURY, OR CONTAMINATED ARTICLE				
CONTAMINATED ARTICLE OR AREA	DECONTAMINATION AGENT USED	INSTRUMENT	SURVEY RESULTS		FINAL DISPOSITION OF ARTICLES
			BEFORE	AFTER	
WOUND COUNT /5 MIN		BKGD COUNT /5 MIN		SOURCE COUNT /5 MIN	
SAFETY MEASURES	PERTINENT SAFETY MEASURES IN EFFECT ☐ YES ☐ NO		IF NO, EXPLAIN		
REMARKS					
EMPLOYEE SIGNATURE			HEALTH PHYSICS SIGNATURE		

AECOM

211 EAST GRAND AVENUE
CHICAGO, IL

STANDARD OPERATING PROCEDURE

Title: Sample Preparation Procedure for Gamma Spectral Analysis

Document: SOP-364

Revision Number: 0

Date: November 5, 2010

Replaces: None

SAMPLE PREPARATION PROCEDURE FOR NUTRANL ANALYSIS

1.0 SCOPE

1.1 Purpose

The purpose of this procedure is to provide guidance for the preparation of samples for analysis of radioactive nuclides. This procedure applies specifically to samples prepared for NUTRANL analysis.

1.2 Applicability

This procedure applies to all soil-type environmental samples, including soil, rocks, concrete, and construction debris.

2.0 REFERENCES

2.1 10 CFR Part 20 Standards for Protection Against Radiation

3.0 DEFINITIONS

None

4.0 REQUIREMENTS

4.1 Prerequisites

NONE

4.2 Tools, Materials, Equipment

4.2.1 The following equipment is needed to perform this procedure:

- 20 ml sample vials
- Sieve of one-quarter inch mesh
- Analytical balance
- Marinelli beakers
- Zip-lock bags
- Labels
- Paper towels

4.3 Precautions, Limits

4.3.1 Samples prepared for receipt at field laboratory for NUTRANL analysis are homogenized during sample collection prior to receipt at the field laboratory for analysis. No other physical preparation is performed at the laboratory for screening samples (NUTRANL analysis). Any corrections or analysis other than NUTRANL pulse height analysis shall be performed by an outside contract laboratory. This includes U. S. Environmental Protection Agency (USEPA) verification samples and quality control (QC) samples.

4.3.2 All samples not known to be homogenous must be homogenized prior to analysis.

4.3.3 NUTRANL analysis is designed and calibrated for analysis of low activity samples, specifically for documenting closure at less than the specified cleanup criteria. High activity samples may produce anomalous results due to algorithms in the NUTRANL programming.

4.4 Acceptance Criteria

Proper preparation during sample collection ensures that the samples submitted to the laboratory are representative of the material sampled and suitable for the required analysis. Acceptable samples will be homogeneous with regard to size of material; appearance with regard to color, moisture and soil type; shall not contain materials over the specified maximum gradation; and shall be free of external adhering soil or other materials.

5.0 PROCEDURE

5.1 All Samples

5.1.1 All samples submitted for analysis must be logged in the chain of custody book. The following information shall be recorded and shall be taken directly from the field chain of custody form or a copy of the chain of custody form must be filed in the chain of custody book.

- Description or grid location
- Purpose of sample which may include:
  - Activity screening
  - Pre-verification
  - Verification
  - Overburden
  - Imported fill
  - Calibration quality control check
- Date and time of sampling
- Originator of sample
- Corresponding count rate from survey meter (optional)

5.1.2 Ensure that outside of sample container is free from potential contamination, by wiping it clean with a paper towel.

5.1.3 Place blank label on outside of container and record the sample ID, which is a unique sequential number used to identify individual samples. The unique sequential number, sample ID, is obtained from project sample log books.

5.1.4 Weigh the sample on the analytical balance. Subtract the empty (tare) weight which is recorded on the side of each vial and record the net weight in grams on the label.

5.1.5 Prepare the sample in accordance with the requirements of the analysis requested.

5.1.6 Samples will have already been homogenized and passed through a ¼ inch mesh during sampling. It should not be necessary for any samples to be re-opened in the field laboratory. This will eliminate the potential for the field laboratory area to become cross-contaminated. This will also allow for ingrowth. Note will be made on the sample label each time the vial is opened.

5.1.7 Verification samples received for the USEPA are also logged in the chain of custody book. Verification samples are prepared in the same manner as others; however, they come in batches of five 20 ml vials. When samples are to be picked up by the USEPA, place each batch of five sub-samples in its own zip-lock bag.

5.2 Quality Control Samples

5.2.1 QC Samples shall be placed into 500 ml Marinelli beakers prior to analysis.

5.2.2 The technician obtaining the sample shall obtain a split sample into a 20 ml sample vial from the Marinelli beaker. This split is performed in the exclusion zone prior to submitting the sample for analysis. The split sample shall be labeled with the same description as the QC sample. The split sample shall be homogeneous with regard to the remainder of the QC sample.

5.2.3 The net weight of the Marinelli beaker shall be noted on the sample label attached to the beaker. The net weight is obtained by subtracting the weight of the beaker (tare) from the total weight of the filled beaker. The tare (empty) weight of the Marinelli beaker is recorded on the outside of each beaker.

5.2.4 The outside laboratory performing analysis of the QC sample shall be responsible for all additional sample preparation, and requested analysis. This includes moisture correction and/or daughter nuclide ingrowth analysis.

5.2.5 Analyze the split sample (20-ml vial) using the NUTRANL System and retain records for future comparison to gamma spectroscopy results.

6.0 RECORDS/REPORTS/NOTIFICATIONS

6.1 Notify the laboratory technician when the samples are properly labeled and ready for analysis.

6.2 Samples shall be retained until all evaluations have been completed and the sample is no longer needed. Samples will not be discarded until written notice is received from USEPA. Samples may be transferred to a secure holding area off-site.

6.3 Retain a paper copy of all sample analysis reports

7.0 ATTACHMENTS

None

Appendix E

Plans

Dust Control Plan
Emergency Contingency Plan
Verification Sampling Plan

AECOM

211 EAST GRAND AVENUE
CHICAGO, IL

Title: Dust Control Plan

Revision Number: 0

Date: November 5, 2010

Replaces: New

DUST CONTROL PLAN

1.0 PURPOSE

The Dust Control Plan (Plan) describes methods AECOM and its contractors will follow to conduct operations and maintain the work area within the subject site (Site) so as to minimize the creation and dispersion of dust. This Plan also contains corrective measures that will be used in the event visual dust is created, air monitoring shows excessive particulates, or air sampling indicates limits have been exceeded.

A primary concern during the excavation activities at the Site will be the generation of radioactive particulates from excavation and earth-moving equipment. Fugitive dust generation may be caused by a range of activities including excavation, loading, and transportation of excavated soils. Traffic on the Site also may cause resuspension of particulates.

Dust control measures will be used throughout the excavation and restoration activities at the site, especially during excavation, backfilling, and grading activities.

2.0 GUIDANCE

Dust control will be performed in accordance with the Removal Action Work Plan (Work Plan), the Health and Safety Plan (HASP), and the Air Monitoring Procedure SOP-212. AECOM will perform site perimeter air monitoring in accordance with the Air Monitoring Procedure SOP-212.

3.0 IMPLEMENTATION

AECOM will be responsible for implementing dust control procedures as required in this Plan, the HASP, and the Air Monitoring Procedure SOP-212. The Field Team Leader will be responsible for ensuring compliance with the dust control procedures at the excavation site.

4.0 PRODUCTS

Water will be used in connection with mechanical dust suppression. Chemical foams, such as fire fighter foam, may also be used if approved by USEPA. If available, water will be obtained at the Site. If water cannot be obtained at the Site, temporary sources of water can be provided for construction activities from water trucks parked adjacent to the property or from portable plastic water tanks. Small (1,800 gallon) water trucks equipped with several hundred feet of hose and a pump can be used to spray water. Also, small pumps and hose can be used with the portable tanks to provide sufficient pressure and volume for dust control. In the event that a chemical foam is utilize a Material Safety Data Sheet (MSDS) will be forwarded to US EPA.

5.0 EXECUTION

Procedures to be followed to control dust may include traffic speed control, use of stockpiles, covering vehicles transporting borrow material and waste, and wind screens around excavation areas. These procedures will be utilized during excavation, restoration, transportation and associated materials handling activities.

5.1 Traffic Speeds

Traffic speeds will be maintained in accordance with applicable County, City, State and Federal regulations. The speed limit for traffic on the site will not be in excess of 15 miles per hour.

5.2 Use of Stockpiles

Where possible, excavated contaminated materials will be loaded into the transport containers the same day they are excavated. Any radiologically-impacted material stored on-site will be either in containers or in Supersacks if there is not sufficient material to mobilize a container. Stockpiled clean material, including excavated and borrow material, will be piled to minimize dust generation. Further, slopes of stockpiled materials will be minimized in the prevailing wind direction. A 5:1 slope or flatter in the prevailing wind direction will be maintained whenever possible. Stockpiles will be constructed with their length perpendicular to the prevailing wind direction.

Stockpiled material will be covered during periods of high wind or when work on a stockpile is not actively occurring, such as the end of the work day. Stockpiles will be covered with a geomembrane cover to minimize dust generation during excavation and restoration activities. Approved geomembrane covers are Griffolyn TX 1200 manufactured by REEF Industries, Inc., and Sani-Cover SC #250 manufactured by Fluid Systems, Inc., or other equivalent.

5.3 Off-Site Transportation of Excavated Materials

Trucks used for transporting non-contaminated excavated or borrow material will be equipped with truck bed covers (tarps) to prevent the generation of dust from hauling. The tarps will be fastened down tightly to prevent materials from being blown out of the trucks. Empty trucks also will be tarped.

Roll-off containers for transporting low-level radioactive materials, will be lined with plastic or suitable leakproof liner and be equipped with full covers. The covers will be securely fastened to the containers before leaving the excavation area.

Trucks and other heavy equipment will be cleaned to remove mud, soil, and loose dust prior to leaving an excavation area. This cleaning will include the truck tires. Dirt that is tracked onto paved streets will be swept and added to stockpiles at the excavation area.

5.4 Use of Water as a Dust Suppressant

Water will be applied during the course of excavation and restoration activities as directed by the Field Team Leader to prevent, mitigate, or reduce dust resulting from excavation activities. Water will be applied when:

- wind or vehicular traffic may cause visible dust generation;
- exposed surfaces of material stockpiles are potentially dry and wind or handling activities may cause dust generation;
- dust generation is possible during excavation activities on the site;
- hauling of excavated or borrow material may cause visible dust generation in truck beds; or
- dust generation is possible during placement of materials in stockpiles or fill areas.

A water truck or pump and storage tank assembly will apply water to the exposed ground surfaces via hoses, pumps, nozzles and other appurtenances as required. The truck or pump/tank assembly also will apply water to control dust generation from exposed surfaces of material stockpiles, excavation activities, and hauling or excavation of borrow material.

Water will be applied in sufficient quantity to prevent generation of dust, but not so as to cause the movement of water beyond site boundaries, ponding, or the disruption of other project site areas. Because the soils will absorb the water, watering is not expected to generate runoff. The Field Team

Leader will monitor the excavation and restoration activities to make sure that enough water is used to adequately control dust, but that not too much water is used so as to create runoff.

5.5 Corrective Measures

If visual dust is created at a location during the excavation and restoration activities, or if air monitoring shows excessive particulates, the following corrective measures will be evaluated and applied as appropriate.

1. Increased wetting of surface areas.
2. Covering additional source areas.
3. Modifying future excavations and stockpiles to decrease the source areas.
4. Halting dust-creating activities until winds moderate.
5. Modify work activities.

If overwatering creates runoff into undisturbed areas, the water will be removed as practical, and the area radiologically surveyed. If radioactivity above the action level is found, the area will be cleaned by removing the contaminated materials, or by other appropriate means. Future occurrences will be prevented by more carefully controlling the amount of water applied by constructing earth berms around the area to retain the water, or by using a method of dust control other than water.

AECOM

211 EAST GRAND AVENUE
CHICAGO, IL

Title: Emergency Contingency Plan

Revision Number: 0

Date: November 5, 2010

Replaces: New

EMERGENCY CONTINGENCY PLAN

1.0 SCOPE OF PLAN

The purpose of the Emergency Contingency Plan (ECP) is to provide guidance and direction in the event of an unanticipated exposure of an individual to hazardous substances or hazardous conditions related to the excavation and restoration activities at the Site.

Personnel assigned to this project will be required to review thoroughly the contents of this ECP and to strictly adhere to the policies and procedures provided herein.

2.0 EMERGENCY AND EVACUATION PLAN

2.1 Emergency Coordination

The Field Team Leader will coordinate emergency response at the Site. In the event of an emergency, the Field Team Leader will immediately notify the AECOM Project Manager. The AECOM Project Manager will be responsible for notifying the proper response agencies listed in Figure 1, Emergency Phone Numbers. Emergency response procedures, instructions for emergency response to injuries and evacuation plans will be reviewed at safety briefings.

2.2 Emergency Services Contacts

Before field activities commence, the Field Team Leader will inform the appropriate emergency contacts about the nature and duration of work expected at the Site and the type of contaminants and possible health or safety effects or emergencies involving these contaminants.

All hospital treatment should be provided via the 911 Emergency Medical System, with the Chicago Fire Department providing ambulance service. Emergency services can be provided by Northwestern Memorial Hospital located within one-half mile of the Site. The location and possible route to the hospital from the Site, including narrative directions, are shown on Figure 2.

The emergency telephone numbers listed in Figure 1 will be distributed to the Field Team Leader. Emergency numbers will be reviewed every three months by the AECOM Project Manager and revised, as necessary. The AECOM Project Manager will date and sign new revisions. The Field Team Leader will record the date of the revised telephone number list in his daily log book. Upon revision, the figure will be submitted to the USEPA and the City.

2.3 Implementation

The Field Team Leader will implement the emergency action procedures whenever conditions at the Site warrant such action. The Field Team Leader will be responsible for coordinating the evacuation, emergency treatment and emergency transport of site personnel, as necessary, and informing the appropriate coordinating management staff. The following conditions may require implementation of emergency action procedures:

- Fire or explosion on-site.
- Serious personal injury.
- Release of radioactivity exceeding one Annual Limit of Intake (ALI) as defined in 32 IAC 340.1220 in a 24-hour period.
- Release of hazardous materials, including gases or vapors, at elevated levels.
- Unsafe working conditions, such as inclement weather (tornado, hail, etc.).

2.4 Fire or Explosion

If fire or explosion takes place, emergency steps shall include: 1) evacuation of work area; and 2) notification of local fire department and other appropriate emergency response groups listed on Figure 1, as necessary (e.g., if a spill occurs, the emergency spill hotline will be notified).

2.5 Personal Injury

Actions to be taken in the event of personal injury are described in the Health and Safety Plan, Section 4.3.4, Emergency Medical Treatment.

2.6 Evacuation Plan

All project personnel will evacuate the area under the direction of the Field Team Leader. Evacuation from the affected area will be initiated by sounding an alarm, such as an air-horn, megaphone or other form of notification.

A coordinated evacuation will be conducted with all project personnel using the most direct upwind route, avoiding the point of emergency.

All project personnel involved in the evacuation will immediately move to the Decontamination/Transition area and will remain there awaiting further instructions from the Field Team Leader.

Personal Protective Equipment will be used at all times by the project personnel during the evacuation procedures.

2.7 Accident and Incident Reporting

All accidents, injuries and incidents shall be reported to the Field Team Leader. An Accident/Injury Form will be completed by the Field Team Leader, as described in the HASP, Section 4.4, Accident and Incident Reporting.

FIGURE 1
EMERGENCY PHONE NUMBERS

Police Department	911
Fire Department	911
Ambulance	911
Hospital Address Phone	Northwestern Memorial Hospital 250 E. Superior (312) 908-2000 (Ask for ER)
Poison Control Center	(800) 732-2200
USEPA Region 5 24-hours Emergency Number	(312) 353-2318
AECOM Project Coordinator Steven Kornder	847-279-2448 (work) 847-343-6007 (mobile)
AECOM Project Manager Steven Kornder	847-279-2448 (work) 847-343-6007 (mobile)
AECOM Field Team Leader Brian Schmidt	847-778-6727 (mobile)

SECONDARY EMERGENCY NUMBERS

The AECOM Project Manager will evaluate when these agencies should be notified.

National Response Hotline	(800) 424-8802
Illinois Emergency Management Agency	(217) 782-7860
Illinois Environmental Protection Agency Emergency Response Duty Officer	(217) 782-7860 or (217) 782-3657, IEPA ERU during normal working hours.
Illinois Department of Nuclear Safety (IDNS) Emergency Number	(217) 785-0600 (24 hour Radiologic Assistance)

FIGURE 2
HOSPITAL LOCATION AND DIRECTIONS
Northwestern Memorial Hospital
250 E. Superior Street
Chicago, IL 60611

Directions:

1. Start at 211 E GRAND AVE, CHICAGO going toward N ST CLAIR ST	**go 121 ft**
2. Turn on N ST CLAIR ST	**go 0.27 mi**
3. Turn on E SUPERIOR ST	**go 423 ft**
4. Arrive at 250 E SUPERIOR ST, CHICAGO, on the left	

AECOM

211 EAST GRAND AVENUE
CHICAGO, IL

Title: Verification Sampling Plan

Revision Number: 0

Date: November 5, 2010

Replaces: New

VERIFICATION SAMPLING PLAN

1.0 INTRODUCTION

1.1 Purpose

This Verification Sampling Plan (Plan) describes the sampling activities and analytical methods that will be used to demonstrate the subject site meets the cleanup criteria. By following the protocol included in this plan, the USEPA will demonstrate the Site meets the cleanup criteria described in Section V.2.d of the Unilateral Administrative Order (UAO).

1.2 Scope

The verification survey will be conducted as excavation activities are completed at a Site. The purpose is to demonstrate the soils have been excavated to meet the cleanup criteria described in the UAO. Averaging over areas up to 100 square meters is allowed, but only after reasonable efforts have been made to achieve levels As Low As Reasonably Achievable (ALARA). (Reference SOP-223 "Verification Survey Procedure").

1.3 Contaminants of Concern

The verification program includes testing for specific constituents which are indicative of the contaminants of concern. Constituents of concern that may be encountered on the Site are the entire U-238 and Th-232 decay series; however, measurements will only be made for total radium (Ra-226 and Ra-228).

1.4 References

The following references have been used in developing this Plan:

- Administrative Order by Consent, USEPA, 1996;
- 32 IAC 332.150(b) - Soil Radioactivity and Exposure Rate Criteria;
- DOE Order 5480.11 and 10 CFR 20 - Surface Contamination and Exposures (ALARA); and
- NUREG/CR 5849 "Manual for Conducting Radiological Surveys in Support of License Termination" Draft June 92.

Standard Operating Procedures (SOPs) used during the verification sampling are included in the Standard Operating Procedures - Appendix D.

2.0 EXCAVATION CONTROL

2.1 Gamma Survey

A gamma survey will be done after the excavation is thought to be complete. The survey will comprise verification testing of the excavation.

Gamma measurements will be made over the entirety of the excavation. The procedure and instrumentation used will be 2 x 2 NaI detectors. This procedure provides a gamma measurement survey over an area of approximately one-square-meter. The gamma measurements will be collected over the entire area of the excavation to determine the concentration of radium remaining.

If the gamma survey indicates areas where the measured radium concentration exceeds the cleanup criteria of 5 pCi/g radium (Ra-226 and Ra-228) above background, additional material will be removed

until the measured radium concentration is less than 5 pCi/g above background. Exceptions may be made to this operational criterion with USEPA concurrence.

In addition to the gamma survey, AECOM will obtain samples for laboratory testing to measure the total radium concentration of soils. Such testing may be used to resolve ambiguous gamma survey measurements, to establish or verify gamma/radium correlations, or to provide additional data to verify that the cleanup criteria have been met at the excavation. At least one composite soil sample will be taken for laboratory analysis from each excavation. The samples will be taken in accordance with the soil sampling procedure in SOP-214, and tested for radium (Ra-226 and Ra-228). Apparently clean material below the radiologically-impacted soil may be excavated to facilitate verification. This material will require sampling as overburden if it is to be managed as clean soil for backfill.

2.1.1 Gamma Survey Procedure

The gamma survey will be performed according to the Gamma Survey Standard Operating Procedure (SOP-210).

2.1.2 Documentation

The Verification Gamma Survey drawing described above will be used to document the readings obtained during the gamma survey. The drawing also will contain information pertaining to background gamma radiation levels and instrument calibration.

2.1.3 Quality Control

The gamma survey will be performed by trained individuals who have sufficient skill to obtain accurate and consistent information. All information obtained during gamma surveys will be reviewed by the Field Team Leader for accuracy and consistency.

All field equipment will be calibrated either in accordance with NUREG/CR 5849 "Manual for Conducting Radiological Surveys in Support of License Termination" Draft June 1992 or with industry-recognized protocols. Instrument response background and check source tests will be performed and recorded daily to ensure instrument operations are within the established acceptable range.

At least 5 percent of the survey area will be resurveyed. Readings from the initial survey will be compared to those readings obtained during the quality control (QC) survey to identify instrument malfunctions or reading/document errors.

3.0 DECONTAMINATION

All discarded materials, waste materials, and otter field equipment and supplies shall be handled in such a way to prevent the potential spread of contamination during excavation and restoration activities. Discarded items that have contacted contaminated materials will be containerized and stored for disposal at the approved disposal facility. Non-contaminated items to be discarded will be collected for disposal as non-hazardous waste. Personnel and sampling equipment decontamination are described in the Decontamination Procedure included as SOP 347.

Appendix F

Specifications

Section 01010	**Summary of Work**
Section 01020	**Construction Health and Safety**
Section 02010	**Demolition and Debris Removal**
Section 02200	**Contaminated Material Loadout and Earthwork**
Section 02840	**Site Utilities**

211 EAST GRAND AVENUE
CHICAGO, IL

Title: Summary of Work

Section 01010

Revision Number: 0

Date: November 5, 2010

Replaces: New

SECTION 01010

SUMMARY OF WORK

PART 1 - GENERAL

1.1 Description of the Project

This project directed by the United States Environmental Protection Agency Region 5 (USEPA) is at a location designated by the USEPA as related to the Lindsay Light II Site in Chicago, Illinois. The work covered by these specifications includes the following.

A. Site Description

Radioactive materials in concentrations above background have been found within the Streeterville area in the City of Chicago. The presumptive source of these materials is the Lindsay Light Company in Chicago.

The Site is defined as the property bounded by East Grand Avenue to the north and a public alley which can be access from North St. Clair Street, Chicago, Illinois. Final definition of the limits of soil excavation and restoration will be the responsibility of the Respondents and their consultants and contractors.

B. Project Description

1. Work for the cleanup of the Site will be excavation and removal of impacted soil.

2. Site preparation includes all of the work which must be done before any excavation and restoration can begin. Some of the work, such as determining background air quality and background radiation, will be common to the entire Site. Other work, such as verifying the extent of contamination and documenting existing physical conditions, will be area-specific.

   a. Access Agreements. Discussions concerning access will begin promptly upon approval notice from the USEPA. Every effort will be made to keep the property owner and the USEPA informed of any changes to the work and to the schedule.

   b. Permits. Under Superfund, the Site developer is exempt from obtaining permits from the City of Chicago and Cook County for remediation removal activities conducted on-site, but must obtain permits for portions of the work accomplished off-site. Some permits, particularly those issued by the Department of Transportation to commercial carriers to transport the excavated soils and debris over public streets, will not be sought and, therefore, are not addressed in this Plan. The Site developer will contract only with transportation companies qualified and licensed to carry such materials.

   c. Background Air Monitoring. Unless otherwise waived by the USEPA, monitoring and analyses to be conducted prior to beginning excavation at the Site will provide adequate data to determine a background air quality which can be used for the Site. A description of the air monitoring that will be done is included in the Air Monitoring Plan for the Site including the proposed location for the background sample.

   d. Site Survey. If one is not already available, prior to work at the Site a current site survey will be prepared by a licensed surveyor.

e. Soil Sampling. Soil sampling is described in the Soil Sampling Plan (SOP-214). Background gamma values are developed in accordance with Gamma Radiological Surveys (SOP-210).

f. Utilities. For the Site, "utilities" will include, but not be limited to, natural gas, drinking water, waste water, communications, electrical power distribution, and storm water collection systems. The locations of all utilities will be determined, field located and shown on all maps and drawings for the properties. All work to replace, repair or backfill utilities shall be done as required by the appropriate utility company or agency.

g. Buildings. No buildings are present within the areas proposed to be excavated.

3. Excavation and restoration work includes removing any structures, facilities, landscaping or other appurtenances as necessary, excavating contaminated soils, cleaning contaminated buildings, facilities, structures, utilities and appurtenances, verifying that radioactivity greater than the cleanup criteria has been removed and backfilling all excavations. Site restoration is not proposed pending site development and construction.

   a. Work to remove asphalt pavements, sidewalks, foundations, retaining walls, etc., is described in Section 4.0 of the Work Plan

   b. Work to excavate contaminated soils is described in Sections 4.0 and 5.0 in the Health and Safety Plan (HASP) for the Site.

   c. The requirements for soil sampling are described in the Soil Sampling Plan.

   d. The work for properly backfilling all excavations is included in the Work Plan.

1.2 Related Work

Other Part 1 Sections of these Specifications.

1.3 Definitions

A. Access Agreement refers to a legal document between the Contractor, Property Owner and tenant authorizing the Contractor or the USEPA to complete the excavation and restoration action as described in these Specifications, the Work Plan and the HASP.

B. City refers to the City of Chicago and its representatives.

C. Contract Documents for the work consist of the drawings, these specifications and all addenda issued prior to and all modifications issued after the execution of the contract.

D. Contractor refers to AECOM and its subcontractors and consultants.

E. County refers to Cook County, Illinois and its authorized representatives.

F. USEPA refers to the Region 5 office of the United States Environmental Protection Agency and its representatives.

G. Job Set refers to a complete set of Project Record Documents used during construction activities.

H. Project refers to all activities associated with the excavation and restoration action.

I. State refers to the State of Illinois and its authorized representatives.

J. Utilities. For the project, "utilities" will include, but not be limited to, natural gas, drinking water, waste water, communications, and electrical power distribution and storm water collection systems.

K. Work Order refers to the plans, drawings, additional specifications, directions and agreements prepared for properly completing work at the Site.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

3.1 Scope of Work

A. The work to be performed includes furnishing all labor, tools, equipment, materials, transportation, services, and incidentals, and performing all operations necessary for the excavation and transportation of radiologically-impacted soils, and the monitoring of those excavations as shown and noted on the drawings and as required in these Specifications.

B. The work includes the decontamination of the Site and the management of excavation and demolition materials in accordance with the Statement of Work. The work included is further described in Article 3.2, Construction Sequence.

3.2 Construction Sequence

Except as specifically noted, the construction sequence described below is intended as guidance for this project. At the discretion of the Contractor, the work may be done simultaneously or in an order other than below, as long as it will not affect the quality, timely completion, or safety of the work.

B. Mobilization

1. Mobilize personnel, equipment, materials, and temporary facilities needed for the project. Provide for electrical, water, communications and other utilities as required for the work.

2. Provide site-specific training for workers. Discuss work with crews, including areas of special concern (construction and radiological), construction schedule and sequence, and health and safety.

3. Prepare the personnel and equipment decontamination facilities.

4. Select areas within the Site for staging soils, containers and demolition materials. Prepare areas as necessary (e.g., berms for temporary water control, or plastic sheeting if on "clean" area)

5. Set up the air monitoring system and begin monitoring.

6. Set up traffic controls, as required.

C. Contamination Excavation

1. Excavation of contaminated buildings is not anticipated.

2. Excavation of contaminated soil will occur using these steps:

a. Do construction staking or marking (additional surveying, as necessary, for horizontal and vertical limits of soil excavation). These limits will be based on the previous AECOM site investigation reports.

b. As necessary, lock-out, tag-out, and/or shut down all utilities which could affect or be affected by the work. Purge, decontaminate and otherwise properly manage utilities so they can be removed, protected from damage, or relocated, as necessary.

c. Excavate the contaminated soils on the property and transport them to the disposal facility. Stockpile soils on the Site only as necessary.

d. Do soil sampling and gamma surveying to determine if additional excavation is necessary. Excavation will not extend below groundwater.

(i) If necessary, do construction staking. Continue excavating until surveying and sampling indicate all contaminated materials have been removed.

(ii) Notify the USEPA that pre-verification sampling has been completed and request verification surveying and sampling, and if found to meet the closure standard, request approval to backfill.

D. Restoration

1. Restoration is not proposed for the Site. Minimal restoration may consist of flattening the slopes of the excavations. The Site will be regraded in preparation for construction and development.

3.3 Disruption

A. The contractor will, to the extent practical, use his best efforts to undertake the project in a manner that avoids unnecessary disruption of local businesses and their customers or tenants.

3.4 Work Quality Control

A. Shop and field work shall be performed by personnel thoroughly trained and experienced in their field of expertise. Work on this project shall be performed in accordance with the best practices of the various trades involved.

B. Quality control inspections will be conducted for all construction activities under these specifications. The inspector will be independent of the work activity being inspected.

C. Work will be certified as having been completed in full satisfaction of these Specifications.

D. Work will be done as required by these Specifications, the Work Plan and other documents referenced in these Specifications.

AECOM

211 EAST GRAND AVENUE
CHICAGO, IL

Title: Construction Health and Safety

Section 01020

Revision Number: 0

Date: November 5, 2010

Replaces: New

SECTION 01020

CONSTRUCTION HEALTH AND SAFETY

PART 1 - GENERAL

1.1 Scope

A formal Health and Safety Plan (HASP) has been prepared for the work described in these Specifications. This section of the Specifications summarizes the requirements of the HASP as they apply to the construction work, and references those sections of the HASP where detailed descriptions of the health and safety requirements and procedures can be found.

1.2 Related Work

A. Other Part 1Sections of the Specifications
B. Section 02010 - Demolition and Debris Removal
C. Section 02200 – Contaminated Material Loadout and Earthwork
D. Section 02840 - Site Utilities

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

3.1 Safeguards will be taken to ensure the safety of workers in and around excavations. These will include, but not be limited to, the following:

a. Stairways, ladders, ramps, or other safe means of egress will be located in trench excavations that are 4 feet or more in depth.

b. No persons will be permitted underneath loads handled by lifting or digging equipment. Personnel are required to stand away from any vehicles being loaded or unloaded to avoid being struck by any spillage or falling materials.

c. All trenches and excavations 6 inches or deeper will be marked and guarded for the duration of the project with barricades placed a minimum of 2 feet from the edge of the excavation to prevent persons from falling into the opening.

d. Precautions will be taken to prevent surface or runoff water from entering the excavation. Ditches, dikes, or other effective means will be installed or used to prevent water from entering the excavation and to drain the surrounding areas.

e. Any excavation that meets the definition of a confined space will be treated as such, as defined by OSHA 1910.146, and all applicable procedures detailed in Section 13 of the HASP will be followed. A crawl space or storm cellar area could fall within the definition of a confined space if it: (1) is large enough and so configured that personnel can bodily enter and perform assigned work; and (2) has limited or restricted means for entry or exit; and (3) is not designed for continuous personnel occupancy.

f. All personnel in an excavation greater than four feet in depth will be protected from cave-ins by an adequate protective system. An adequate protective system will include barrier protection (e.g., shoring or trench boxes) or sloping. Other protective measures required by 29 CFR 1926, Subpart P also will be provided.

g. The determination of the angle of repose and design of any supporting system will be based on careful evaluation of pertinent factors such as depth of cut; possible variation in water content of material while the excavation is open; anticipated changes in materials from exposure to air, sun, water, or freezing; loading imposed by structures, equipment, overlying material, or stored material; and vibration from equipment, blasting, traffic, or other sources.

h. Daily inspections of excavations, the adjacent areas, and protective systems will be made and documented by a competent person. The documentation will include indications of potential cave-ins, failure of protective systems, hazardous atmospheres, or other conditions.

i. No employee or any other person will work adjacent to or enter an excavation until the work area has been inspected by the competent person. The inspection will determine if conditions exist which may expose workers to moving ground or any other unsafe conditions. Any deficiencies identified during inspections will be adequately corrected prior to work in excavation.

3.2 Training

1. All persons active in the excavation work at the Site will receive training as specified in Section 5 of the HASP for work with low-level radioactive materials. The training program in Section 5 of the HASP is in accordance with 29 CFR 1910.

2. In addition to the training above, periodic "tailgate" health and safety meetings will be held. The purpose of these meetings will be to discuss deficiencies in health and safety practices, discuss hazards specific to new properties or encountered at existing properties, discuss the results of monitoring, and generally reinforce good health and safety practices. A typical form for such meetings is found in Section 5 of the HASP.

3. Special training shall be provided or required for work such as the following.

   a. Supervisory Work. All supervisors shall have received at least the additional eight hours training required by OSHA.

   b. Truck Driver. All truck drivers shall be instructed in and knowledgeable about the routes to be used between the property and the train station, the requirements of the work (work with and transport of potentially radioactive materials), and the emergency and contingency procedures to be implemented in the event of an accident.

   c. All persons employed in the transport and handling of radioactive materials shall have received HAZMAT training.

   d. A competent person will be on-site for shoring.

3.3. Personal Protective Equipment (PPE) - Based on information obtained from monitoring observation of similar work at vicinity properties, work at this Site can be done in Level D PPE. The Health and Safety Coordinator will evaluate individual tasks and work areas and specify particular types of PPE based on this evaluation. PPE utilized in the performance of the work under these specifications will be in accordance with Sections 7 and 8 of the HASP.

3.4 Hot Work

A. Flame welding and cutting operations

1. Gas bottles shall be properly color-coded, in good condition, and stored in a secured manner in racks or carts. Bottles with corroded or damaged threads will not be used.

2. Regulators shall be in good condition, and suitable for the use.

3. Fuel gas and oxygen hose shall be easily distinguishable and shall not be interchangeable. Hoses shall be inspected at the beginning of each shift and shall be repaired or replaced if defective.

3.5 Transporting Contaminated Materials Over Uncontaminated Areas

A. Transport between the Site and the Rail Terminal

1. Haul routes between the Site and the rail terminal will be defined (see Transportation and Logistics Plan) and all operators will be instructed in the location and use of these routes. Transport of contaminated materials will be over designated routes only.

2. Rolloff containers used to transport contaminated materials over uncontaminated areas will be capable of transporting the material without spillage. Covers will be secured onto the containers prior to exiting the contaminated area. Empty trucks returning to the site will be tarped, as will trucks supplying clean backfill, topsoil, and related construction materials. Tarps will be fastened down tightly to prevent material from being blown out of the trucks.

3. Trucks and rolloff containers used to transport contaminated materials will be frisked and decontaminated if necessary in accordance with Subpart 3.8, below, prior to exiting the contaminated area.

4. Should a truck hauling contaminated material from the Site to the rail terminal accidentally spill any part of its load, the Contractor will direct site workers to assist in the cleanup. Spill cleanup, including proper notification of agencies and authorities, will be accomplished in accordance with the Emergency Contingency Plan.

B. Transport within a Property

1. Haulage routes will be established within the Site and all workers will be instructed in the location and use of these routes. Following excavation and restoration of soils and other materials, such routes will be examined, visually and with radiation detection equipment, for the presence of spilled materials. All spilled materials will be removed.

2. Practices to control spillage will be implemented during excavation and restoration. These practices will include such things as the following:

   a. Not filling haul equipment above the sides of the bed or bucket,

   b. Limiting travel speed, and

   c. Covering haul routes with clean soil or other materials. Such materials would be inspected as above, and decontaminated for reuse or properly transported to the rail terminal for eventual transfer to the approved disposal facility.

3.6 Equipment Decontamination Facilities

A. Equipment Decontamination Station – If necessary, an equipment decontamination station will be made available for the decontamination of vehicles, tools, and equipment, prior to exiting the controlled area. The equipment decontamination station will be located within the secured area, and will include the following:

1. A steam pressure washer for removing contamination from the wheels, tracks, and other surfaces of the equipment and trucks.

B. Release of Construction Vehicles and Equipment for Unrestricted Use - Prior to being released from the Exclusion Zone, all construction vehicles and equipment will be frisked, and decontaminated if necessary. Contaminated vehicles and equipment will be decontaminated using a pressurized water spray in accordance with Subpart A, above. Water generated during the decontamination activities will be evaporated, infiltrated within the Exclusion Zone, used for dust control, or collected and stored on the Site for other purposes or eventual disposal.

3.7 Dust and Water Runoff Control

A. Dust control measures used during work activities on the Site may include, but are not limited to the following:

1. Using hoses with mist or fog nozzles to spray light applications of water over the areas of excavation or demolition, staging, loadout, and dumping/storage. The Contractor will be responsible for the control of excess water.

2. Minimizing travel over soil areas. Some travel over contaminated soils (e.g., by excavation equipment and by haul trucks) may be necessary. Dust minimization procedures will include, but not be limited to, the following.

   a. Within the property, the speed limit for trucks and excavation equipment will be fifteen miles per hour.
   b. Areas which will be used extensively as travelways (e.g., entrances to and exits from equipment decontamination facilities) will be sprayed with water as necessary to control dust.

3. Storage and staging piles will be covered when not in use.

B. Runoff water control measures on the Site may include, but are not limited to the following:

1. Excavation of temporary swales, ditches, and/or retention ponds.

2. Construction of temporary diversion dikes and berms.

3. Pumping of water to runoff water control facilities. Water removed from contaminated excavations will be evaporated, used for dust control, or collected and stored on the Site.

3.8 Contingency Plans and Emergency Response Procedures

Contingency plans and emergency response procedures for Site activities are provided in the Emergency and Contingency Plan. These plans and procedures will be followed in the event of an emergency situation arising from the work activities or acts of God that may affect the environment or human health and safety.

AECOM

211 EAST GRAND AVENUE
CHICAGO, IL

Title: Demolition and Debris Removal

Section 02010

Revision Number: 0

Date: November 5, 2010

Replaces: New

SECTION 02010

DEMOLITION AND DEBRIS REMOVAL

1.0 GENERAL

1.1 Scope

A. This section describes excavation requirements for existing Site features, including:

1. Salvage Disposition, Storage, and Handling of Property.
2. Demolition of Existing Site Features.
3. Sawcutting.
4. Debris Segregation, Decontamination, Haulage, Storage, and Disposal.
5. Matching and Patch Repairing.

B. Descriptions for radiological surveying are specified in the Work Plan, Appendix F (Verification Sampling Plan)

1.2 Related Work

A. Part 1 Sections of these Specifications.

B. Section 02840 - Site Utilities

1.3 Salvage Disposition. Storage and Handling of Property

A. Remove all structures, equipment, facilities, materials and other items called for in the Work Plan or that otherwise must be removed to access the work areas and store as directed. Such items shall be removed completely, including appurtenances, and shall be properly protected.

B. All non-radiologically-impacted materials, equipment, and other items permanently removed from the work area for the proper completion of the excavation work shall be properly managed and/or disposed as applicable.

1.4 Submittals

A. All submittals shall be made to the AECOM Project Manager.

B. Submit landfill tickets for all uncontaminated debris disposed offsite, no more than five days after disposal, except where dumpsters are emptied directly into collection trucks. The use of dumpsters will be recorded in the field logbook. Each ticket shall contain at least the information below.

1. Date of disposal.
2. Estimated volume or weight of load if required by the designated measurement method of the landfill.
3. Description of materials disposed.

4. Name of wastehauling subcontractor.

1.5 Health and Safety Conditions of the Work

In addition to the hazards common to demolition, radioactive materials are known to be present at this Site, and may be present in or on slabs/paving, structures, facilities and utilities.

A. Detailed health and safety requirements for work on the vicinity properties are included in Section 01020 of these Specifications and the HASP.

B. All demolition work will be done as required by OSHA regulations published in 29 CFR 1910 and 1926. These regulations are included by reference in these Specifications.

C. Based on existing information, excavation work can proceed under Level D personal protection conditions (see HASP). Air and soil monitoring and sampling will be done during the conduct of the work to determine if modifications to Level D work conditions are necessary.

1. The Contractor shall be prepared to discontinue work in an area and begin work in an alternate area if monitoring and sampling indicate changes in the work conditions may be necessary and if so directed by the AECOM Project Manager, AECOM Field Team Leader, or their Agent.

2. The Contractor shall be prepared to begin working under changed conditions (greater than or equal to Level D personal protection with appropriate personal, equipment and vehicle decontamination) with minimal delay. Additional requirements which may be necessary if asphalt, concrete, wood, metal or other construction materials containing hazardous materials or levels of radiation above background are encountered are discussed in Section 01020 of these Specifications.

D. The Quality Assurance Supervisor, Field Team Leader, or Health and Safety Coordinator may bar from the Site any person or persons who shows a disregard for health and safety of themselves or others.

1.6 Permits

A. The Contractor shall be responsible for obtaining all permits required for the work and additions described in this section of these Specifications.

B. Copies of all the necessary permits shall be provided to the Project Quality Assurance Supervisor prior to beginning the work.

C. At a minimum, all work shall be done in accordance with the requirements of the permits. The requirements of these permits are included by reference in these Specifications. Where the requirements of the permits and these Specifications are in conflict, the more stringent requirements shall apply.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

3.1 General

A. The work performed under these Specifications shall be done as indicated in this Work Plan, specified herein, and as required by the permits and the laws, rules and regulations of the City of Chicago, the State of Illinois and the USEPA.

B. The Contractor shall remove existing property features as indicated in the Work Plan and shall perform demolition in a manner to allow segregation and proper disposal of contaminated and uncontaminated material. The Contractor must use methods and operations which will minimize the potential for the spread of contamination.

C. It shall be the Contractor's responsibility:

1. To maintain adequate safety measures and working conditions (see Section 01020 of these Specifications and the HASP).

2. To take all measures necessary during the performance of the work to protect the entire project area and adjacent properties which would be affected by this work from storm damage, flood hazard, caving of trenches and embankments, and sloughing of material, until final acceptance by the AECOM Project Manager, AECOM Field Team Leader, or their Agent.

3. To maintain completed areas until the entire project area is in satisfactory compliance with the Specifications.

3.2 Structure Demolition

A. General

No structures are present on the site, where excavation is proposed.

B. Foundations

1. The methods used to demolish and remove foundations shall be at the discretion of the Contractor, as long as the requirements of these Specifications, the permits, and the laws, rules and regulations of the City, County, State, OSHA or the USEPA, whichever are more stringent, are met.

2. All demolition of foundations shall be done in a manner to minimize disturbance of the surrounding and underlying soil. This could include, but not be limited to, pre-breaking or sawing the foundation elements, and the measures described in Article 3.3 of these Specifications.

3. Concrete, rock or block foundations may be demolished and reduced in size as described in the foregoing subpart.

4. Foundation walls which serve as retaining walls to support earth or adjoining structures shall not be demolished until such earth has been properly braced, or adjoining structures have been underpinned to prevent movement. Bracing and shoring shall be evaluated and, if necessary, designed by a qualified Professional Engineer.

5. Adjacent foundation walls and "party" walls to a basement, which are to serve as retaining walls against which fill or debris will be placed, shall be checked for structural strength before they are to be so used. Evaluations and, if necessary, designs of shoring and bracing shall be done by a qualified Professional Engineer.

6. Foundations and basement floor slabs will be removed to verify conditions beneath them. The concrete, if not contaminated, will be staged on-site for later removal or will be removed as clean debris. Concrete found to be impacted will be decontaminated in accordance with SOP-345. If decontamination cannot be reasonably completed, the concrete will be reduced in size sufficient to be managed as impacted and loaded for off-site shipment and disposal.

C. Retaining Walls

1. The methods used to demolish and remove retaining walls shall be at the discretion of the Contractor, as long as the requirements of these Specifications, the permits, and the laws, rules and regulations of the City, County, State, OSHA or the USEPA, whichever are more stringent, are met.

2. All demolition of retaining walls shall be done in a manner to minimize disturbance of the surrounding and underlying soil. This could include, but not be limited to, pre-breaking or sawing the pavement and slabs, and the measures described in Article 3.3 of these Specifications.

3. Shoring or bracing may be necessary during the demolition of retaining walls. Shoring or bracing shall be designed by a qualified Professional Engineer, competent in soils. Shoring and bracing designs shall be submitted to the Respondents or their Agent and the Field Team Leader prior to beginning excavation where their use may be necessary.

4. Concrete, rock or block foundations may be demolished and reduced in size as described in the foregoing subpart.

3.3 Sawcutting

A. The Contractor shall be responsible for all sawcutting necessary for the excavation of contamination whether described in the Work Plan or not. The Contractor shall sawcut concrete, masonry, asphalt paving, and other work as needed, observing the following requirements:

1. The Contractor shall provide liquid or other dust control for all sawcutting of contaminated materials or materials overlying contaminated materials.

2. Finished vertical concrete or masonry cuts shall be made using a track-mounted concrete saw. The finished cut shall be a minimum of three inches deep, in a straight and true line.

3. Finished horizontal concrete or masonry cuts shall be made using a cradle-mounted concrete saw. Make the finished cut a minimum of three inches deep, in a straight and true line.

4. Where portions of masonry will be removed and replaced, masonry excavation and restoration shall be along mortar joints so the finished wall will have the same masonry pattern as the existing.

5. Finished asphalt paving cuts shall be made using an asphalt blade in a cradle-mounted saw. The finished cut shall be a minimum of two inches deep, in a straight and true line.

6. If a clean break cannot be made where new concrete will be replaced against old concrete, provide sawcutting necessary to produce clean edges on the existing concrete.

3.4 Decontamination of Items

A. Some contaminated items such as slabs, pavement, and piping, can be decontaminated and disposed in industrial or other landfills. Decontamination of items will include removing the

contaminated dust, dirt or encrustations from the surfaces of the items. Decontamination may be accomplished by high-pressure spraying, or manually removing contaminated materials with brushes, soap and water, rags, and miscellaneous hand tools until the items are verified as radiologically suitable for the proposed disposal.

B. Decontamination of contaminated equipment, tools, materials and supplies is described in detail in SOP-347 Decontamination.

3.5 Contaminated Material Loadout and Transport

A. General Requirements

1. Before beginning contaminated material loadout operations, the Contractor shall construct temporary site drainage facilities, and if necessary, initiate dust control measures. The Contractor also shall construct all decontamination and loadout facilities and establish survey controls.

2. The Contractor shall use equipment and methods that minimize the potential for spillage of materials during loading operations.

3. At a minimum, the loadout shall be cleaned (liquid and nonliquid wastes removed) at the end of every other day. Spilled materials shall be promptly removed from the loading facility if the quantity is such that the material could be picked up and transported out of the loadout facility.

4. All decontamination of equipment shall be done as required herein and by SOP-347 Decontamination.

5. In no case shall equipment with radioactivity above the release levels be allowed to leave the Site.

B. Loadout

1. All loadout of material will be done as required by these Specifications and the Work Plan. Loading of trucks and other containers with contaminated soil or debris shall be done only in the loadout or equipment decontamination areas.

2. Contaminated soils and debris will be loaded directly into containers as they are excavated, and the container staged in a clean area for pickup and transport. Materials will be placed so they do not extend above the sides of the container. Materials protruding above the sides of the container will be pushed down or removed for placement into another container. If isolated quantities of impacted soil are encountered in volumes less than necessary to fill a container, the material will be placed in Supersacks and stored temporarily until there is sufficient material accumulated to fill a container.

3. Rolloff containers will be secured with lids.

4. Drivers shall remain inside the truck with the windows closed or shall exit the truck prior to loading.

C. Decontamination

1. Detailed requirements for the decontamination of trucks and containers are provided in SOP-347 Decontamination.

2. Following loading in the loadout area, and decontamination if such is necessary, all trucks and containers will be frisked.

3. If frisking shows such is necessary, trucks and containers will be decontaminated by wiping or spraying.

4. Trucks and containers need a final survey prior to unrestricted release from the loadout.

D. Transport

1. Trucks picking up and dropping off containers at the staging areas outside of the loadout need not be decontaminated unless a container spill has occurred.

2. Trucks shall only use the designated route(s) to transport materials from the Site to the rail terminal, and shall obey all signs, speed limits and other traffic laws. Any driver not obeying traffic laws, or the requirements of these Specifications, shall be removed from the work.

3. All trucks shall properly display decal with all information required for transport of contaminated materials.

4. Each truck shall carry the standard industry bill of lading for each shipment to the rail terminal.

5. All truck drivers shall have the training required by 29 CFR 1910.120 and shall be trained in the procedures to be used in the event of an emergency, as described in the Emergency Contingency Plan.

3.6 Storage

A. All storage or stockpiling of materials shall be done as required by Section 02200 of these Specifications and described in the Work Plan.

B. On the Subject Site

1. Non-radioactive materials, including fill, may be temporarily stockpiled (staged) on the Site in the locations noted in the Work Plan, or as approved or directed by AECOM or its Agent.

   a. As necessary, staged non-radioactive materials shall be covered or otherwise managed to control dust.

2. Radioactive materials may be staged on the Site only with written approval from the USEPA and approval by the AECOM Project Manager.

   a. Radioactive materials shall only be stored on contaminated or specially prepared areas to minimize the potential for contamination of "clean" areas.

   b. All excavated radioactive materials shall be containerized by the end of the day. If isolated quantities of impacted soil are encountered in volumes less than necessary to fill a container, the material will be placed in Supersacks and stored temporarily until there is sufficient material accumulated to fill a container.

   c. Except when work is actively in progress, the staged contaminated materials that are not containerized shall be stored temporarily in Supersacks on-site. Radiologically-impacted material that cannot be placed in containers for overnight storage will not be excavated.

C. On the Rail Terminal Site

1. If radiologically-impacted materials will be transported by rail for disposal, the loaded and tarped containers will be stored at the rail terminal temporarily until the appropriate train is loaded and dispatched to the permanent disposal facility.

3.7 Disposal

A. At a minimum, all materials shall be disposed as required by the permits, these Specifications, and the laws, rules and regulations of the State of Illinois or the USEPA, whichever are more stringent. All materials to be disposed shall be surveyed as required by SOP-345 to determine they are suitable for the intended disposal method and location.

B. If clean materials are disposed by landfilling or recycling, the Contractor shall provide the AECOM Project Manager and the Field Team Leader with the name of the landfill or recycler.

1. The landfill or recycler must be qualified to receive the waste. The landfill or recycler must provide the Contractor with qualification information.

2. The AECOM Project Manager or its Agent has the right to reject any landfill which does not meet qualification standards.

3.8 Cleanup

Upon completion of work in this section, all rubbish and debris shall be removed from the job site. Soils or fill materials that were excavated from the site and were determined not to exceed the radiological cleanup standard of 7.1 pCi/g total radium (Ra-226 + Ra-228) may be used or redeposited on the site as fill material. All construction equipment and implements of service shall be removed and the entire area involved shall be left in a neat, clean and acceptable condition.

AECOM

211 EAST GRAND AVENUE
CHICAGO, IL

Title: Contaminated Material Loadout and Earthwork

Section 02200

Revision Number: 0

Date: November 5, 2010

Replaces: New

SECTION 02200

CONTAMINATED MATERIAL LOADOUT AND EARTHWORK

PART 1 - GENERAL

1.1 Scope

A. General

1. Descriptions of the landscaping, structures, etc. for the Site are included in the Work Plan of which these Specifications are a part.

1.2 Related Work

A. Part 1 Sections of these Specifications

B. Section 02010 - Demolition and Debris Removal

D. Section 02840 - Site Utilities

1.3 Site Investigation

A. Investigation Reports

Investigation reports included in the Appendices may be used as a guide to conditions on this project as they contain boring summaries and related information depicting surface and subsurface conditions at specific locations at the Site. Surface and soils conditions at other locations may differ from conditions occurring at the boring locations. Therefore, further investigations will be done prior to and during the excavation activities.

B. Contractor's/Subcontractor's Responsibility

The Contractor/Subcontractor shall carefully examine the Site and make all inspections necessary in order to determine the full extent of the work. The Contractor/Subcontractor shall satisfy himself as to the nature, location and conditions of the work, the conformation and condition of the existing ground surface, and the character of equipment and facilities needed prior to and during prosecution of the work. The Contractor/Subcontractor shall satisfy himself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered. Any inaccuracies or discrepancies between the actual field conditions and the Work Plan, or between the Work Plan and Specifications, must be brought to the attention of the Project Coordinator in order to clarify the exact nature of the work to be performed.

1.4 Health and Safety

A. Detailed discussions of the potential hazards and the requirements for minimizing the potential for harm to project and offsite personnel, and to the environment, are provided in Section 01020 and Section 1.5 of this section of these Specifications.

B. All work shall be done under the supervision of personnel experienced and qualified for the work.

C. All work will be done as required by OSHA regulations published in 29 CFR 1910 and 1926. These regulations are included by reference in these Specifications.

D. Based on preliminary results, sampling and analyses of soils from the Site indicate levels of radioactivity in the soils above background levels. Based on the sampling and surveys, the work can proceed under Level D personal protection conditions. Air and soil monitoring and sampling will be done during the conduct of the work to determine if modifications to Level D work conditions are necessary (see Sections 01020 and 02010 of these Specifications). A complete description of health and safety requirements for this site is provided in the Health and Safety Plan (HASP) for this project.

   1. The Contractor shall be prepared to discontinue work in an area and begin work in an alternate area if monitoring and sampling indicate changes in the work conditions may be necessary and if so directed by the Respondents or his Agent.

   2. The Contractor shall be prepared to begin working under changed conditions (greater than or equal to Level D personal protection with appropriate personal, equipment and vehicle decontamination) with minimal delay. The requirements which may be necessary if asphalt, concrete, wood, metal or other construction materials containing levels of radiation above background encountered are discussed in Section 02010 of these Specifications.

E. The Field Team Leader or Health and Safety Coordinator may bar any person from the site who, in their opinion, shows a disregard for health and safety requirements.

1.5 Environmental Safeguards and Regulations

A. The Contractor shall comply with all federal, State, and local regulations, and the requirements of these Specifications at all times to prevent pollution of air, water and soil.

B. The Contractor will preserve and protect all structures, equipment, and vegetation (such as trees, shrubs and grass) on or adjacent to the work area, which is not to be removed and which does not unreasonably interfere with the excavation or restoration work. The Contractor will only remove trees when such is required by the Work Plan and will avoid damaging vegetation that will remain in place. Limbs or branches of trees broken by the contractor will be trimmed with a clean cut, and the cut painted with a tree-pruning compound.

C. The Contractor will control air and water pollution as described in these Specifications and the Work Plan.

1.6 Permits

A. The Contractor shall be responsible for obtaining all permits required for the work and additions described in this section of these Specifications.

B. Copies of all the necessary permits shall be provided to the Project Quality Assurance Manager prior to beginning the work.

C. At a minimum, all work shall be done in accordance with the requirements of the permits. The requirements of these permits are included by reference in these Specifications. Where the requirements of the permits and these Specifications are in conflict, the more stringent requirements shall apply.

1.7 Submittals

A. All submittals shall be made to the Respondents or their Agent, with copies submitted to the Field Team Leader.

B. The Contractor shall maintain a log of those submittals directed by the Respondents.

C. Import Backfill Materials

1. The Contractor will submit a list showing materials expected to be imported, and the name(s) and locations of the supplier(s) of each type of material.

2. Submit analyses such as radioactivity, geotechnical, gradation, and proctor test results of backfill materials, and certification of conformance with material specifications as determined by the testing consultant for each material, in accordance with testing per Section 2.E of this specification.

3. The above information shall be submitted with the Work Plan for the Site for each source, prior to use.

D. Imported Backfill Material Truck Tickets

1. Submit imported backfill material truck tickets no less than five days prior to submittal of application for payment of the applicable items of work. Minimum required information on truck tickets includes the following.

   a. Date of delivery.
   b. Material description.
   c. Truck identification number or license number.
   d. Gross weight and tare weight or volume of load.
   e. Supplier name/source.
   f. Signatures of scale operator and truck driver.

2. Truck tickets without the above information will not be accepted for payment.

E. Soil Compaction Test Report

1. Submit soil compaction test reports indicating test results from the testing consultant. The Contractor shall be prepared to provide preliminary test results within 24 hours of the test. Final test results shall be submitted to the Contractor and available for review within seven days of testing.

2. Test results shall include time and date of test, test methodology, location of test, name of person and firm conducting the testing, and any pertinent information which may affect the test results.

1.8 Definitions

A. Excavation. Excavation is defined as reaching the lines, grades, elevations and contamination depths shown in the Work Plan or determined by in-place monitoring. Excavation of uncontaminated topsoil, silt, clay, sand, gravel, talus, soft or disintegrated rock, boulder or detached pieces of soil rock or debris shall be included, as well as excavation of contaminated material. During the excavation work, monitoring of radiological contamination of the excavated material will be done by the Respondents.

B. Contaminated Soil

1. Soil which must be excavated, transported, or disposed under special conditions. Soil from these sites may have levels of radioactivity above background. Determining the vertical and horizontal extent of contaminated soil will be the responsibility of the Respondents.

2. Soils containing concentrations of Ra-226 plus Ra-228 greater than five picoCuries per gram (5 pCi/g) of dry soil above natural background averaged over six-inch thick layer are considered radioactively contaminated.

C. Salvaged Excavation Materials Uncontaminated soil materials from designated areas of the Site suitable for use as common or structural fill which are not otherwise classified as unsatisfactory (see Part 2 of this Section). Unless otherwise directed by the Work Plan or the Respondents' Agent, salvaged excavation materials shall be used to backfill designated onsite excavations a minimum of six inches below finished grade.

D. Overexcavation. Excavation of any type of material in excess of the lines, grades or depths indicated in the Work Plan or beyond the limits defined by the Work Plan or Specifications.

E. Unsatisfactory Fill Materials Unsatisfactory materials for fill include, but are not limited to, materials containing organic matter, trash, debris, frozen materials, materials containing radioactivity or other hazardous contaminants in excess of regulatory standards, and materials not meeting the criteria of Part 2 of this section. Materials which are unsuitable due to excessive or insufficient moisture or gradation may be used if they can be brought into compliance with the requirements of Part 2 of this section by screening, manipulation, aerating, watering, or blending with other suitable materials. Unsatisfactory fill materials shall not be used.

F. Percent Maximum Density. Percent maximum density is a percentage of the maximum density at optimum moisture obtained by the appropriate test procedure.

G. Stockpile Construction. Stockpile construction is defined as construction of a stabilized fill which will serve as a temporary storage stockpile constructed of contaminated or uncontaminated materials.

H. Subgrade Preparation Subgrade preparation includes fine grading, scarification and compaction, of existing ground, upon which additional materials will be placed.

1.9 Applicable Publications.

The publications listed below form a part of these Specifications to the extent referenced. The publications are referred to in the text by the basic designations below.

1. American Society for Testing and Materials standard methods of testing. Hereinafter designated as ASTM. The letters and numbers following ASTM (e.g., D698) refer to a particular test.

2. Standard Specifications for Road and Bridge Construction, Illinois Department of Transportation. Hereinafter referred to as State Specifications.

3. Standard Specifications for Water and Sewer Main Construction in Illinois, Fourth Edition.

4. City of Chicago Zoning Ordinances.

1.10 Quality Assurance

A. The Respondents shall make available soil-testing services, either through its own forces or through a soils-testing consultant. The Respondents shall be responsible for taking soil samples and performing moisture-density, gradation, and other tests to ascertain the completed work is in compliance with these Specifications. Samples may be taken at the place of excavation, stockpiles, or from the fill itself. The Respondents shall conduct density and other tests on the fill

as required by these Specifications. The Contractor shall assist the Respondents as necessary to enable sampling and testing.

B. The Field Team Leader shall be a person qualified and experienced in the work described in these Specifications.

C. By Contractor/Subcontractors

1. All work shall be done under the supervision and control of experienced and qualified personnel, competent in the areas of expertise required for the work described in these Specifications and other documents.

2. The Contractor, at his discretion, may have such tests and inspections as he may desire performed by other qualified personnel or independent testing services, for his guidance and control of the work. The cost for such tests and inspections shall be borne by the Contractor. The Quality Assurance Supervisor will consider the results of such testing in determining whether work has been properly done, but the approval of work shall be made by the Respondents or their Agent.

D. Applicable Criteria. Tests and Standards

1. For Excavation of Radioactive Soils. Detailed descriptions of the testing methods and equipment for radioactive soils are described in the Verification Sampling Plan. All soils containing concentrations of Ra-226 plus Ra-228 greater than five pCi/g of dry soil above background, averaged over a six inch layer, shall be removed.

2. For Disposal of Radioactive Soils. All contaminated soils will be disposed in the manner approved by the USEPA. At present, this is to transport the material to a facility licensed to accept these materials for disposal.

3. For Site Earthwork

   a. Except for grading and fill under pavement, slabs or structures, surfaces shall be excavated, or filled or graded to plus or minus 0.2 feet (±0.2') of line, slope and elevation shown in the Work Plan, provided in these Specifications, or as directed by the Project Coordinator or Field Team Leader.
   b. Areas under pavement, slab or structures shall be filled and/or graded to t0.1 feet.
   c. The Contractor will provide survey control for establishing and maintaining excavation and fill. Cut and fill stakes will be placed as necessary, but at least on 50-foot centers, to control excavation and fill. All surveys required to meet City of Chicago earthwork permit requirements shall be performed by a licensed land surveyor. Other surveying will be done by an experienced line and grade surveyor.
   d. Following completion of the work, the Site shall be surveyed to confirm all regrading and reconstruction work has been done to proper line and grade.

4. Compaction

   a. Compaction of backfilled common materials shall be to at least 90 percent of maximum density (standard proctor - ASTM D698) for areas not covered by structures, paving or slabs, to at least 95% of maximum density for areas to be covered by paving or slabs, and to at least 95% for areas under structures and utilities.
   b. Compaction of backfilled select or structural materials shall be to at least 92% of maximum density (standard proctor - ASTM D698) for areas not covered by structures, paving or slabs, to at least 95% of maximum density for areas to be covered by paving or slabs, and to at least 95% for areas under structures and utilities.

c. Maximum densities and optimum moisture information can be obtained from borrow area operators; if this information is not available, the Contractor shall obtain samples representative of all soils to be used for common backfill and provide them to the Respondents or their Agent for testing. Test samples will be provided before backfilling begins.

5. Compaction Testing shall be done on at least 50-foot centers or at least once per lift. Compaction will be tested and determined by competent personnel using methods such as nuclear density gauges (if proper calibration can be achieved), sand cones, or other methods. Compaction work shall be sufficiently observed and all areas of a lift shall be visually inspected by the Respondents or their Agent and the Field Team Leader so they can state their opinion that areas not tested for compaction have been compacted as tested areas.

6. Soils testing. All soils testing (gradations, liquid limits, etc.) will be done using American Society for Testing and Materials (ASTM) procedures and methods.

7. Cleanup. The Contractor shall remove all rubbish, debris, junk, temporary materials, and any surplus excavated materials from the Site, as directed by the Respondents or their Agent. Excavation and proper disposal of these materials and the restoration of staging and storage areas and temporary roads to the satisfaction of the Respondents or their Agent shall be a condition for final acceptance.

PART 2 - PRODUCTS

2.1 Backfill Materials

A. General - Fill materials shall be obtained from suitable stockpiles or borrow as defined in these Specifications. Materials containing organic (except topsoil), perishable, spongy, frozen, expansive or other deleterious materials shall not be acceptable.

B. Materials for Common Fill shall consist of any material imported or excavated from the cut or other borrow sources that, in the opinion of the Respondents or their Agent, are suitable for use in constructing fills. The material shall contain no rocks or hard lumps greater than four (4) inches in size and shall contain at least 40 percent of material smaller than 1/4-inch sieve opening in size. No material of a perishable, spongy, or otherwise improper nature shall be used in filling.

C. Imported Fill

1. Roadbase materials shall conform to State Specifications Section 704.

2. Crushed Rock or Stone for use as fill shall conform to State Specifications Section 704.01.

3. Fine Aggregate or Sand shall conform to State Specifications Section 703.04.

4. Structural Fill under building slabs, ramps, and stairs shall conform to State Specifications Section 704.04, CA-6 or CA-10.

5. Selected Granular Backfill shall conform to Section 20-2.21 C of the Standard Specifications for Water and Sewer Main Construction in Illinois, FA-1 or FA-2.

D. Material placed within 24 inches of rough grade shall be select material that contains no rocks or hard lumps greater than four (4) inches in size and that swells less than 3% when compacted as hereinafter specified for compacted fill.

E. Soils testing

1. Prior to use, all off-site soil sources shall be tested as follows:

   a. Radioactivity Material must be tested for radioactivity and found to be within background ranges (3.7 pCi/g as established by the USEPA in Tech Memo date March 15, 1995).
   b. Engineering Classification ASTM D2487
   c. Standard Proctor Compaction ASTM D698

2. Provide one series of tests for each 10,000 cubic yards of borrow soil used. At least one series of tests will be obtained from each borrow source to be used.

3. Testing of potential on-site soil backfill is described in the Field Sampling Plan.

PART 3 - EXECUTION

3.1 General

A. The work performed under these Specifications shall be constructed to the lines, grades, elevations, slopes and cross-sections indicated in the Work Plan, specified herein, and/or directed by the Respondents or their Agent. Slopes, graded surfaces, and drainage features shall present a neat uniform appearance upon completion of the work.

B. It shall be the Contractor's responsibility:

1. To maintain adequate safety measures and working conditions.

2. To take all measures necessary during the performance of the work to protect the entire project area and adjacent properties which would be affected by this work from storm damage, flood hazard, caving of trenches and embankments, and sloughing of material, until final acceptance by the Respondents or their Agent.

3. To maintain completed areas until the entire project area is in satisfactory compliance with the Specifications.

C. Utility lines and structures indicated in the Work Plan which are to remain in service shall be protected by the Contractor from any damage as a result of his operations.

1. Where utility lines or structures not shown in the Work Plan are encountered, the Contractor shall report them to the Respondents or their Agent before proceeding with the work.

2. Unless their excavation is necessary to allow work to proceed or as a result of contamination, the Contractor shall bear the cost of repair or replacement of any marked utility lines or structures which are broken or damaged by his operations.

3. All repair work, including backfilling, shall be done as required by the governing utility or agency. The Contractor shall contact the governing utility or agency and determine the requirements for properly completing the work. A description of the requirements may be requested to be provided to the Respondents and the Field Team Leader before any work is done.

3.2 Excavation and Restorations. Clearing and Grubbing

A. Clearing. Clearing consists of the complete excavation of objectionable materials and obstructions above and below the ground surface, including tree stumps, brush, grass, vegetative

matter and other objectionable materials within the project limits. All brush and organic material shall be removed before placing any earth fill unless the earth fill to be placed is topsoil.

B. Grubbing, Grubbing consists of the complete excavation of stumps, including tap roots or lateral roots 1-1/2 inches or more in diameter, and the excavation of brush, grass or weeds to depths below the natural ground as specified herein. Stumps shall be grubbed to a depth of 3 feet and grass or weed shall be grubbed to a depth of 12 inches below the natural ground surface, or to the depths as determined in the field by the Respondents or their Agent at the time of construction.

C. Protection. Existing items not designated to be demolished or removed shall be protected from damage. Any such item damaged by the Contractor shall be restored or replaced immediately at the Contractor's expense.

D. Debris and Surplus Material. All debris and surplus material resulting from clearing, and grubbing shall be removed from the site and properly managed by the Contractor. The requirements for managing concrete and asphalt materials are described in Section 02010 of these Specifications.

3.3 Dust Control

The Contractor shall take all steps practical to control dust arising from the construction activity. Detailed discussions of the requirements and potential methods for controlling dust are described in Appendix A of the Work Plan.

3.4 Control of Drainage Water

A. The Contractor shall control drainage water in the area of construction operations, and control storm water and wastewater reaching the construction area from any source, so that no damage will be done to the work or to the environment. The Contractor shall be responsible for any damages to persons or property on or off the construction site due to such drainage water or to the interruption or diversion of such storm water or wastewater on account of his operations.

B. Surface grading shall be done as may be necessary to prevent surface water from flowing into excavations.

1. Any water accumulating therein shall be removed by pumping or by other approved methods.

2. Any water accumulating in a work area which may be contaminated will be tested prior to disposal. If contaminated, such water will be disposed as directed by the Respondents or their Agent.

3. Any water which is the result of the Contractor's failure to properly control drainage will be removed and disposed at the Contractor's expense.

3.5 Excavation

A. General

1. The locations of surveyed benchmarks and estimated depths of cut for beginning the work are shown in the Work Plan. The Contractor shall be responsible for providing additional staking and surveying, including both horizontal and vertical controls, to ensure the Work is done to the standards of these Specifications. The Project Coordinator and Field Team Leader will be available to assist and advise the Contractor.

2. The Contractor shall perform all excavation necessary or required as shown in the Work Plan, or required by these Specifications or the Respondents or their Agent. The excavation shall include the disposal or stockpiling of all materials of whatever nature encountered, which shall include both contaminated soil excavation and common soil excavation when both are present, and shall include the furnishing, placing, and maintaining of shoring and bracing necessary to safely support the sides of the excavations.

3. If the horizontal and vertical limits of excavation, as determined by radiological testing, are less than shown in the Work Plan, the Contractor shall excavate only those materials necessary to achieve compliance with the standards of these Specifications.

4. If the horizontal and vertical limits of excavation, as determined by radiological testing are greater than shown in the Work Plan, the Contractor shall extend the limits of excavation as necessary to achieve compliance with the standards of these Specifications.

5. Excavated material shall be placed a sufficient distance from the edge of the excavation to avoid cave-ins or bank slides. In no case shall excavated materials be placed closer than three feet to the edge of the excavation.

6. Shoring and bracing, if necessary, shall be designed by a qualified Professional Engineer competent in soils engineering.

7. The work also shall include all pumping, ditching and other required measures for the removal or exclusion of water.

B. Contaminated Soils

1. Interpretation of the Work Plan

   a. The Work Plan indicates the estimated horizontal and vertical extent of a contaminated deposit.
   b. Depths of contaminated and uncontaminated soils indicated in the Work Plan represent the total estimated depth from the ground surface to the base of the contamination. The different depths shown across a given deposit are an indication of how the actual contamination depths might be expected to change throughout a given deposit.
   c. Information in the Work Plan indicates the existing surface cover material. Unless otherwise indicated, the replacement surface cover shall match existing.
   d. All contaminated materials, including clay, silt, sand, gravel, cobbles and boulders, and rock will be excavated. The Contractor shall be prepared to conduct whatever excavation is necessary to remove contaminated materials.

2. Excavation Procedures

   a. If possible, contaminated material shall be removed from outlying areas and boundaries of contaminated areas, working toward the equipment decontamination and loadout facilities, to minimize the potential to contaminate "clean" areas.
   b. Truck or container loading shall be done only on ground contaminated and designated for cleanup or on the equipment decontamination pad or other area specially prepared for such work. Care should be taken to avoid spilling during loading.
   c. Contaminated (see Subpart 1.8, B, Definitions of this section) and uncontaminated soils shall be separated during excavation and kept separate during loading, transport and stockpiling to minimize the potential for cross-contamination.

d. Excavations shall be performed carefully to minimize the potential for mixing with underlying soils. Also, cleated or crawler-type equipment shall not be allowed without prior approval of the Respondents or their Agent.
e. Excavations will be radiologically monitored and surveyed by the radiologic technicians to determine if additional material must be removed. Detailed descriptions of the radiological monitoring requirements during excavation are provided in applicable SOPs.
f. The Contractor shall excavate contaminated and uncontaminated soil to within three inches of the design or estimated depth. From this point, excavation should proceed in no greater than six-inch lifts to the depths indicated in the Work Plan. After excavation of each lift, the Respondents will radiologically monitor the excavation and delineate additional excavation required (see the Field Sampling Plan).
g. Exceptions to these requirements must be approved in writing by the Respondents or their Agent and provided to the Field Team Leader. The Contractor will not be paid for removing extra quantities resulting from a deviation from the above requirements, unless a specific deviation has received prior written approval.

D. Other

Uncontaminated material, including clay, silt, sand, gravel, cobbles and boulders and rock, may need to be removed for slopes on excavations, to expose contaminated soils, structures or facilities, or to facilitate work to remove contaminated soils, structures or facilities. Common materials removed from such areas may be used for backfill if they meet the requirements for fill material. If unsuitable, they shall be removed, transported and disposed as surplus excavation.

3.6 Contaminated Material Loadout and Transport

A. General Requirements

1. Before beginning contaminated material loadout operations, the Contractor shall construct temporary site drainage facilities and initiate dust control measures. The Contractor also shall construct all decontamination and loadout facilities and establish survey controls.

2. The Contractor shall use equipment and methods that minimize the potential for spillage of materials during loading operations.

3. At a minimum, the truck loadout shall be cleaned (liquid and nonliquid wastes removed) at the end of every day. Spilled materials shall be promptly removed from the loading facility if the quantity is such that the material will be picked up and transported out of the loadout facility (e.g., dirt clods which could stick to tires).

4. All decontamination of equipment shall be done as required by Section 01020 and this section of these Specifications.

B. Loadout

1. All debris, such as concrete, asphalt, etc., shall be managed as described in Section 02010 of these Specifications.

2. All loadout of material will be done as required by these Specifications and the Work Plan prepared by the Contractor. Loading of trucks and other containers shall be done only in the loadout or equipment decontamination facilities.

3. Unless staging areas have been selected by the Contractor and approved by the Respondents or their Agent, soils and debris will be loaded directly into trucks or containers as they are excavated, for transport to the rail terminal. Materials will be placed so they do

not extend above the sides of the truck bed or container. Materials protruding above the sides of the truck or container will be pushed down or removed for placement into another truck or container by loading equipment or personnel.

4. Truck beds and containers will be tightly covered with tarps.

5. Truck drivers will generally not enter the Contamination Reduction Zone, but shall remain inside the truck when such entry is required.

C. Decontamination

1. After a truck or container has been loaded and tarped, it will be checked for contamination. The truck tires, body and outside of the bed and the outside of the container will be frisked to determine if contaminated soils are present. If frisking does not detect any contamination, the equipment may be released for travel.

2. If frisking does detect contamination the truck or container will be decontaminated by wiping or spraying.

3. Following decontamination, all trucks and containers shall be frisked for release. If any radioactivity above release levels (see Table 02200-1 at the end of this section) is found, decontamination of those areas will be continued. If spraying or wiping is ineffective in removing contamination, brushes or other means shall be used until release levels are achieved. In no case shall a truck or container with radioactivity above the release levels be allowed to leave the site.

4. After containers are loaded and frisked for release, they- shall be staged in a clean area on the site. The trucks used to transport the containers to the rail yard will not need to be frisked prior to leaving the site, as long as the transport trucks do not enter the Contaminant Reduction Zone.

D. Transport

1. Trucks shall use only the designated route(s) to transport containers with contaminated materials from the Site to the rail terminal, and shall obey all signs, speed limits and other traffic laws. Any driver not obeying traffic laws, or the requirements of these Specifications, shall be removed from the work.

2. All trucks shall properly display a decal with all information required for transport of contaminated materials.

3. Each truck shall carry the standard industry bill of lading for each shipment.

4. All truck drivers shall have the training required by 29 CFR 1910.120 and shall be trained in the procedures to be used in the event of an emergency (see Section 01020, Articles 3.2 and 3.7, of these Specifications, and the Emergency Contingency Plan).

3.7 Fill

A. General

1. Unless otherwise specified, fill material shall be compacted by the Contractor to a density that is not less than 90% of the maximum density, standard proctor (ASTM D698).

2. The upper 18 inches of fill material placed in lawns and other areas to be revegetated shall not be compacted beyond that density needed to provide a stable land surface.

3. In areas where contaminated materials have been removed, the Contractor shall not begin backfilling until a radiological survey has been completed and sign-off has been obtained from the USEPA.

4. All fill shall be final graded to the requirements of Part 1 of this Section. After backfilling is completed, the fill (including topsoil) shall be graded to blend with existing contours where future construction will not be done.

B. Preparing Areas to be Filled

1. All vegetable matter and coarse material which might prevent compaction shall be removed by the Contractor from the surface upon which the fill is to be placed. Any loose and porous soils shall be removed or compacted to a depth specified by the Respondents or their Agent. The surface shall then be plowed or scarified until the surface is free from uneven features that would tend to prevent uniform compaction by the equipment to be used.

2. Where fills are constructed on hillsides or slopes, the slope of the original ground on which the fill is to be placed shall be stepped or keyed by the Contractor. The steps shall extend completely through the soil mantle, if any, and into the underlying formation materials.

3. Fill shall not be placed on ground which has frozen, unless the ground can be worked (e.g., scarified and recompacted) to remove the frost.

C. Placing and Spreading Fill Material

1. The Contractor shall not commence backfilling until a radiological survey of the excavation has been completed which verifies all contaminated materials have been removed as required by these Specifications, and the Field Team Leader has provided the Contractor with verbal authorization to begin backfilling.

2. Fill shall be placed to the line, elevation and grade as required by these Specifications, shown in the Work Plan, or described or shown in the Contractor's Work Plan for this Site. Unless otherwise approved in writing by the Respondents or their Agent, the Contractor shall use fill stakes to guide backfilling.

3. Salvaged soil materials shall be used for backfilling unless determined unsuitable by the Respondents or their Agent.

4. When conditions require that contaminated soil will be left in place, backfill will be placed against contaminated soils. In this situation, a six mil polyethylene barrier will be placed to mark the separation between the soils and to minimize the potential for contaminated soils to fall into the "clean" area. Care will be taken during subsequent operations to prevent contaminated soils from mixing with "clean" soils.

5. Fill material to be compacted shall be placed by the Contractor in one foot , even, continuous layers. Each layer shall be spread evenly and shall be thoroughly mixed during the spreading to obtain uniformity of material in each layer.

6. Uniform moisture distribution in the fill to be compacted shall be obtained by discing, blading or other approved methods prior to compaction of a layer.

a. When the moisture content of the fill material is insufficient to achieve specified density requirements, water shall be added by the Contractor until the moisture content is as specified.
b. When the moisture content of the fill material is too high to achieve specified density requirements, the fill material shall be aerated by the Contractor by blading, mixing, or other satisfactory methods until the moisture content is reduced.

7. Unless otherwise shown in the Work Plan, the Contractor shall maintain a minimum of 10 feet of separation between excavation of contaminated soils and placement of clean fill.

8. Fill on City of Chicago street rights-of-way shall be done as required by City of Chicago Standard Specifications.

D. Compaction

1. After each layer has been placed, mixed and spread evenly, it shall be thoroughly compacted by the Contractor to the required density (see below).

2. Compaction shall be accomplished by sheepsfoot rollers, vibratory rollers, multiple-wheel, pneumatic-tired rollers or other types of acceptable compacting equipment.

a. Selection of compaction equipment will be at the discretion of the Contractor. Equipment shall be of such design that it will be able to compact the fill to the specified density.
b. In areas not accessible to or suitable for larger self-propelled roller or vibratory equipment (e.g., small areas, within 12 inches over the top of utilities, etc.), the maximum loose-layer thickness will be four inches.
c. Compaction shall be continuous over the entire area and the equipment shall make sufficient passes over the material to ensure that the desired density has been obtained over the entire area.
d. The surface of fill slopes shall be compacted so that the slopes are stable and there shall be no excessive loose soil on the slopes.

3. Roadbase backfill shall be compacted to at least 95% of maximum density (ASTM D698 - standard proctor).

4. Common backfill shall be compacted as follows:

a. To at least 90% of maximum density (ASTM D698 - standard proctor) for all areas except as noted below.
b. To at least 95% of maximum density (ASTM D698 - standard proctor) for all areas to be covered with paving.
c. To at least 95% according to ASTM D698 in City of Chicago street right of-ways where asphalt will be placed, except for the upper six-inch layer which will be compacted to not less than 100%.

5. Structural fill under buildings, slabs, ramps and stair shall be compacted to at least 95% of maximum density (ASTM D698).

6. Compaction will not be required in the upper 18 inches of soil placed in lawns or other areas to be revegetated.

E. When an area has been prepared to receive concrete or asphalt, applicable moisture and density requirements shall be maintained in the upper layer until the surface construction is completed.

F. The Contractor shall provide and maintain adequate erosion and drainage control facilities during the construction of the fill areas. The erosion control facilities shall be maintained in optimum condition until the work is complete. The facilities shall be inspected following significant rainfall, repairs made and excess sediment removed. It shall be the Contractor's responsibility to prevent the discharge of sediment offsite or to adjacent water courses.

G. Backfill around Utilities. In any case where utilities are disturbed or exposed, all repair work shall be done in accordance with the requirements of the utility, or the governing agency (see Appendix G - Specification 02840 Site Utilities).

3.8 Storage(Stockpiling)

A. On the Site

1. Non-radioactive materials, including fill, may be temporarily stockpiled on the Site in the locations noted in the Contractor's approved Work Plan, or as approved or directed by the Respondents or their Agent.

    a. As necessary, staged non-radioactive materials shall be covered or otherwise managed to control dust.
    b. Non-radioactive materials shall be removed from the vicinity of the property by the end of the work.

2. Radioactive materials may be staged (temporarily stored) on the Site in locations noted in the Contractor's approved Work Plan.

    a. If not in the approved Work Plan, radioactive materials may be staged on the Site only with written approval from the Respondents or their Agent. These materials shall only be stored on contaminated or specially prepared areas to minimize the potential for contamination of "clean" areas.
    b. Except when work is actively in progress, the staged materials shall be completely covered with impermeable plastic sheeting or other approved covers.

3.9 Disposal

A. At a minimum, all materials shall be disposed as required by the permits, these Specifications, and the laws, rules and regulations of the USEPA, State of Illinois, and the State of Utah.. All materials disposed off the Site shall be surveyed as required by SOP-345 to determine they are suitable for the intended disposal.

B. If the materials are disposed by landfilling or by recycling, the Contractor shall provide the Respondents or their Agent and the Project Coordinator with the name of the landfill or recycler.

1. The landfill and recycler must be qualified to receive the waste. Qualification information must be provided for the landfill or recycler, by the Contractor.

2. The Respondents or their Agent has the right to reject any landfill or recycler which does not meet qualification standards.

3.10 Landscaping

Following completion of backfilling to proper line, elevation and grade, the Contractor shall return to the site and reinstall or replace all designated items to at least original condition, or as otherwise agreed by the Respondents and the property owner. This includes paving, slabs, fences, retaining walls, sprinkler

systems, sod, shrubs, bushes, trees and any other appurtenant landscaping, facilities and structures which were removed for or damaged by the work.

3.11 Surveying

A. A baseline will be established for the Site. This baseline will be tied to the previous USEPA survey done for the property.

B. Items including, but not limited to, the following will be located or identified in relation to the baseline.

   1. Visible property boundaries.

   2. Landscaping.

   3. Facilities.

   4. Structures.

   5. Utilities.

   6. Limits of radioactive contamination. Using the results of previous investigations and the baseline, sufficient stakes or markers will be placed to visibly mark the limits so any contaminated soil can be properly removed.

C. The baseline, as above, and the previous surveys also will be used to locate grids for verification surveying. The size of the grids will depend on the location and the extent of contamination.

D. The work for locating items such as the above can be done with equipment and materials such as the following:

   1. Theodolite.

   2. Compass.

   3. Cloth or steel measuring tape.

3.12 Cleanup

Upon completion of work in this section, all rubbish, debris and excess soils (including fill materials) shall be removed from the job site. All construction equipment and implements of service shall be removed and the entire area involved shall be left in a neat, clean and acceptable condition. Proper cleanup of the properties shall be a condition of acceptance of the work and final payment.

TABLE 02200-1
RELEASE CRITERIA

From U.S. NRC, Regulatory Guide 1.86, Table 1

Nuclide [a]	Average [b,c]	Maximum [b,d]	Removable [b,e]
U_{nat}, U_{235}, U_{238}, and associated decay products	5,000 dpm α per 100 cm^2	15,000 dpm α per 100 cm^2	1,000 dpm α per 100 cm^2
Transuranics, Ra_{226}, Ra_{228}, Th_{230}, Th_{228}, Th_{230}, Pa_{231}, Ac_{227}, I_{125} and I_{129}	100 dpm per 100 cm^2	300 dpm per 100 cm^2	20 dpm per 100 cm^2
Thnat, Th_{232}, Sr_{90}, Ra_{223}, Ra_{224}, U_{232}, I_{126}, I_{131} and I_{133}	1,000 dpm per 100 cm^2	3,000 dpm per 100 cm^2	200 dpm per 100 cm^2
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr_{90} and others noted above.	5,000 dpm β-γ per 100 cm^2	15,000 dpm β-γ per 100 cm^2	1,000 dpm β-γ per 100 cm^2

a Where surface contamination by both alpha- and beta-gamma-emitting nuclides exists, the limits established for alpha- and beta-gamma-emitting nuclides should apply independently.

b As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

c Measurements of average contaminant should not be averaged over more than one square meter. For objects of less surface area, the average should be derived for each such object.

d The maximum contamination level applies to an area of not more than 100 cm^2.

e The amount of removable radioactive material per 100 cm^2 of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced proportionally and the entire surface should be wiped.

AECOM

211 EAST GRAND AVENUE
CHICAGO, IL

Title: Site Utilities

Section 02840

Revision Number: 0

Date: November 5, 2010

Replaces: New

SECTION 02840

SITE UTILITIES

1.0 GENERAL

1.1 Scope

A. This section describes the general requirements for locating, protecting, removing and installing site utilities.

B. The known locations of utilities will be marked prior to start of work by utility locating contractors (DIGGER)..

1. Excavation to or below the locations of known utilities is expected as part of the work for the Site.

2. Utility lines and structures which are to remain in service shall be protected by the Contractor from any damage as a result of his operations.

3. All repair work, including backfilling, shall be done as required by the governing utility or agency. The Contractor shall contact the governing utility or agency and determine the requirements for properly completing the work.

1.2 Related Work

A. Other Part 1 Sections of these Specifications

B. Section 02010 - Demolition and Debris Removal

C. Section 02200 - Contaminated Material Loadout and Earthwork

1.3 Health and Safety

A. Detailed discussions of the potential hazards and the requirements for minimizing the potential for harm to project and offsite personnel, and to the environment, are provided in Section 01020 of these Specifications and the HASP.

B. All work shall be done under the supervision of personnel experienced and qualified for the work.

C. All work will be done as required by OSHA regulations published in 29 CFR 1910 and 1926. These regulations are included by reference in these Specifications.

D. Sampling and analyses of soils from the Site indicate levels of radioactivity in the soils above background levels. Based on the sampling and surveys, the work can proceed under Level D personal protection conditions (see HASP). Air and soil monitoring and sampling will be done during the work to determine if modifications to Level D work conditions are necessary (see Section 02010). Complete descriptions of health and safety requirements for this Site are provided in Section 01020 of these Specifications and the HASP.

1. The Contractor shall be prepared to discontinue work in an area and begin work in an alternate area if monitoring and sampling indicate changes in the work conditions may be necessary and if so directed by AECOM.

2. The Contractor shall be prepared to begin working under changed conditions (greater than or equal to Level D personal protection with appropriate personal equipment and vehicle

decontamination) with minimal delay. The requirements which may be necessary if asphalt, concrete, wood, metal or other construction materials containing hazardous materials or levels of radiation above background are encountered are discussed in Section 02010 of these Specifications.

E. The Field Team Leader or Health and Safety Coordinator may bar any person from the Site who, in their opinion, shows a disregard for health and safety requirements.

1.4 Environmental Safeguards and Regulations

The Contractor shall comply with all federal, state, and local regulations, and the requirements of these Specifications at all times to prevent pollution of air, water and soil. Detailed requirements for the protection of the environment are provided in Section 01020 and the HASP.

1.5 Permits

A. The Contractor shall be responsible for obtaining all permits required for the work and additions described in this section of these Specifications.

B. Copies of all the necessary permits shall be provided to AECOM or their Agent and to the Project Manager prior to beginning the work.

C. At a minimum, all work shall be done in accordance with the requirements of the permits or, if the work is exempted under CERCLA from any permits, in accordance with the substantive requirements which would apply if the work were not exempted from such permits. The requirements of these permits are included by reference in these Specifications. Where the requirements of the permits and these Specifications are in conflict, the more stringent requirements shall apply.

1.6 Quality Assurance

A. Contractor personnel shall be persons qualified by education and experience to perform the duties assigned.

B. The Field Team Leader shall be a person qualified and experienced in the work described in these Specifications. AECOM will provide a Quality Assurance Officer to review all project submittals.

C. All work shall be done according to the requirements of these Specifications.

1.7 Submittals

All submittals shall be made to the AECOM or its Agent.

2.0 PRODUCTS

2.1 Backfill Materials

A. General. Fill materials shall be obtained from suitable stockpiles or borrow as defined in these Specifications. Materials containing organic (except topsoil), perishable, spongy, frozen, expansive or other deleterious materials shall not be acceptable.

B. Embedment. Embedment material shall be fine aggregate or sand as defined by Part 2 of Section 02200 of these Specifications.

2.2 Utilities

Materials used to reconstruct utilities shall be as required by the utility company, the governing municipal agency, or the building code.

3.0 EXECUTION

3.1 Location

A. The known locations of utilities shall be identified prior to the start of any excavation. The Contractor shall be responsible for field verifying utility locations and for obtaining any necessary additional information to properly implement and execute the Work Plan.

   1. Known and suspected utilities are shown on the current site survey. The locations as shown may prove to be inaccurate and other obstructions not shown may be encountered. Any reliance on this information will be at the Contractor's risk. The Contractor shall arrange to have all utilities located by the utility companies or a utility location service prior to beginning work (e.g., DIGGER).

   2. Excavations in the areas of suspected underground utilities shall be done in compliance with current regulations for protection of utilities for the City of Chicago.

B. Utility lines and structures which are to remain in service shall be protected by the Contractor from any damage as a result of his operations.

   1. Where utility lines or structures not shown on the site survey are encountered, the Contractor shall report them to AECOM or its Agent before proceeding with the work.

   2. Unless their excavation is necessary to allow work to proceed or as a result of contamination, the Contractor shall bear the cost of repair or replacement of any marked utility lines or structures which are broken or damaged by his operations.

   3. All repair work, including backfilling, shall be done as required by the governing utility or agency. The Contractor shall contact the governing utility or agency and determine the requirements for properly completing the work.

3.2 Existing Utilities Designated for Excavation

A. Overhead Utilities shall be removed and replaced by the utility if such is necessary for proper completion of the work. If the utility will not or cannot remove them, procedures for excavation will be discussed with and approved by the utility. At a minimum, removal of overhead utilities shall include the following.

   1. Obtain the necessary disconnects and verify the utilities are de-energized and grounded prior to the work.

   2. Remove cables and guy-wires from the utility poles.

   3. Determine if the above- and below-grade sections of the poles are contaminated with radiological materials.

      a. If the above-grade sections are not contaminated and the lower section is, or if the potential for contamination of the below-grade section is unknown, fell above-grade sections of utility poles by sawing or other suitable methods to separate the uncontaminated above-grade sections from the potentially contaminated below-ground section.

b. If both sections are contaminated, the pole may be removed by felling the above-grade part and excavating the below-grade part, or by pulling the pole from the ground with a crane or other equipment.

4. Uncontaminated components of overhead utilities, such as cables, guy-wires, etc., shall be disposed as required by Section 02010 of these Specifications.

5. Contaminated components of overhead utilities shall be removed and processed for loadout and disposal as other contaminated debris (see Section 02010 of these Specifications).

6. Excavated materials shall be handled as required by Subparts 3.5, 3.6, 3.8 and 3.9 of Section 02010 of these Specifications.

B. Underground Utilities to be removed may be removed by the utility. At a minimum, the following procedures shall be used.

1. Obtain the necessary disconnects or shutoffs prior to the work and verify the utility is de-energized, drained, or purged as necessary (lock-out and tag-out procedures properly implemented).

2. Excavate and manage materials to access contaminated utilities or bedding materials as required in Subparts 3.5, 3.6, 3.8 and 3.9 of Section 02010 of these Specifications. Monitoring of excavations will be required both on-site and in adjacent rights-of-way.

3. Remove, decontaminate and dispose of contaminated utility materials as required in subparts 3.5, 3.6, 3.8 and 3.9 of Section 02010 of these Specifications.

4. Replace, repair, or abandon the removed utility as directed by these Specifications and the Work Plan, or the utility company or municipal agency having jurisdiction.

a. Replacement or repairs of the utilities shall be in accordance with the requirements of these Specifications or the utility or agency.

b. Abandoned utilities shall be capped as required by Article 3.3 of this section.

3.3 Underground Utilities Encountered During Excavation

A. Damage to utilities shall be repaired under the supervision of the respective utility service or municipal agency having jurisdiction.

B. Abandoned utilities shall be cleaned of all encrusted contamination. Open ends or broken pipes shall be properly capped.

1. At a minimum, capping may be done by crimping, pouring concrete around, or plugging the open end in such a way as to prevent a "least path of resistance" for any future gas leaks.

2. Capping will be done as required by the utility or municipal agency if their requirements exceed those above.

C. Active utilities shall be supported in-place, if suitable, or removed and replaced as necessary to excavate to the depths shown in the Work Plan.

1. Support or removal and replacement shall comply with the more stringent requirements of the affected utility or municipal agency or these Specifications.

2. Utility lines, whether removed or left in-place, shall be cleaned of encrusted contamination as required and described by Section 02010 of these Specifications.

3. Removed utilities shall be managed and disposed as required in Section 02010 for other demolition debris.

3.4 Underground Utility Installations

A. The Contractor shall coordinate interruptions of utility services through AECOM or its Agent.

B. If utilities are installed after backfilling is complete, all excavations shall be by open cut.

1. The banks of the trenches should be as vertical as possible. Shoring and bracing, as necessary shall be designed by a qualified Professional Engineer competent in soils engineering. The design of shoring and bracing shall be provided to AECOM or its Agent.

2. If rock is encountered, the base of the trench will be overexcavated at least six inches to allow for placement of bedding material.

C. If utilities are installed before backfilling is completed to final line, elevation and grade, the fill shall be to at least 12 inches above the top of the utility before excavation and placement of the utility is begun.

D. Trench Preparation. The bottom of the trench shall be accurately excavated to line, and graded and shaped to fit the lower one-quarter of the pipe to provide uniform bearing and support for each section; wedging and blocking will not be permitted. If the pipe has bell ends, the trench shall be overexcavated at the joints. If the common fill is granular, the base of the trench shall be scarified to a depth of six inches and recompacted to at least 95% of maximum density at ±2% of optimum moisture (standard proctor, ASTM D698). If the common backfill is not granular in nature, the base of the trench shall be overexcavated six inches and backfilled with granular (embedment) material compacted to at least 95% of maximum density at ±2% of optimum moisture.

E. Utility Embedment, All utility lines except electric lines and irrigation lines two inches or less in diameter shall be embedded in fine aggregate (see Subpart 2.1.13 of this section).

1. Embedment material shall extend a distance equivalent to the utility diameter above, below and to the sides of the utility for utilities greater than six inches in diameter. A six-inch embedment shall be provided for utilities less than or equal to six inches in diameter.

2. Care shall be taken not to disturb either the horizontal or vertical alignment of the utility; embed both sides of the utility simultaneously. If necessary, compact embedment material by hand to avoid displacement and damage to the utility.

F. All utility installations shall be inspected by AECOM, and by the utility or municipal agency if necessary, at the following times.

1. Before placing embedment material over the utility.

2. Before placing common fill over the embedment material.

G. Compaction of common material over the utility shall be by manually-operated power equipment or by hand until at least 12 inches of fill has been placed over the utility. Damage to the utility by compaction or other causes after proper installation shall be the responsibility of the Contractor.

H. Tests. Testing shall be done on all repaired or replaced systems. Testing may be done by the utility or municipal agency or Contractor. All testing will be done as required by the utility, municipal agency or applicable building code. All testing will be done in the presence of AECOM, and utility, municipal agency or building inspectors, as necessary.

Lindsay M. Scalise

From: Fulghum.Mary@epamail.epa.gov
Sent: Tuesday, December 04, 2012 5:04 PM
To: Vincent S. Oleszkiewicz
Cc: alex.p@ovcchicago.com; Martwick.Cathleen@epamail.epa.gov; Jablonowski.Eugene@epamail.epa.gov; jose.m@ovcchicago.com; Kornder, Steve; Simon.Verneta@epamail.epa.gov
Subject: Re: 164 E. Grand - Request to Proceed Pursuant to 211 E. Grand Work Plan

Vince- I will confirm with my colleagues tomorrow morning that Steve Kornder's email and your note is consistent with the approach we discussed earlier today. Also, just to be clear, "known contamination" refers to any radiologically contaminated material greater than 7.1 pCi/g that is identified at the property and is not limited to the contamination that has been identified to date. Verneta Simon noted it would be helpful to have a single compilation of all the relied upon plans and SOPs so we are all working from the same set of documents in hand. We look forward to the cleanup! Thank you. --Mary

Mary L. Fulghum
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Chicago, IL 60604

(312) 886-4683 voice
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"Vincent S. Oleszkiewicz" ---12/04/2012 04:24:42 PM---Mary and Cathy - As we discussed, please see the email below from Steve Kornder requesting approval

From: "Vincent S. Oleszkiewicz" <VOleszkiewicz@LeechTishman.com>
To: Mary Fulghum/R5/USEPA/US@EPA, Cathleen Martwick/R5/USEPA/US@EPA, VERNETA SIMON/R5/USEPA/US@EPA, EUGENE JABLONOWSKI/R5/USEPA/US@EPA,
Cc: "alex.p@ovcchicago.com" <alex.p@ovcchicago.com>, "jose.m@ovcchicago.com" <jose.m@ovcchicago.com>, "Steve.Kornder@aecom.com" <Steve.Kornder@aecom.com>
Date: 12/04/2012 04:24 PM
Subject: 164 E. Grand - Request to Proceed Pursuant to 211 E. Grand Work Plan

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Mary and Cathy -

As we discussed, please see the email below from Steve Kornder requesting approval of the Remedial Work Plan for 164 E. Grand Ave., which relies upon the plans and SOP's developed for the Ronald McDonald House Charities site at 211 E. Grand. This Work Plan will be implemented to remediate the known contamination at the Site, as EPA has required in your email to me of yesterday December 3, 2012.

My client wants very much to proceed as soon as possible, and as early as this Saturday December 8, 2012. Please let us know if it is acceptable for us to proceed as outlined in Steve's email below. Steve will contact Verneta directly to discuss sign off verification.

Thanks for your cooperation with this.

Vince Oleszkiewicz

PLEASE NOTE OUR NEW CONTACT INFORMATION:

Vincent S. Oleszkiewicz
voleszkiewicz@leechtishman.com

LEECHTISHMAN

4225 Naperville Road, Suite 230 Lisle, IL 60532
Direct: 630.536.1172 | Mobile: 630.217.1032 | Main: 630.505.1600 | Fax: 630.505.1608
leechtishman.com

Results Matter. EXPECT MORE.

From: Kornder, Steve [mailto:Steve.Kornder@aecom.com]
Sent: Tuesday, December 04, 2012 3:27 PM
To: Vincent S. Oleszkiewicz
Cc: Alex Polanco
Subject: 164 Grand - Request to Use 211 E Grand Work Plan

As discussed earlier today, we would like to proceed with remediation of the known contamination utilizing the methods and SOPs that have historically been used for Streeterville projects. A schedule for conducting the work is currently being developed, and with USEPA approval of the methods and procedures, the remediation could potentially occur as early as Saturday December 8. It is anticipated that the work can potentially be completed within a single day and arrangements for sign-off of the remediated areas will have to be discussed. Once the areas are remediated and signed off by USEPA, we would like to proceed immediately with the backfilling of the excavations and creation of a level interior grade in order to allow the interior masonry work to continue. The Interim Response Action Letter approved for the site (dated October 29, 2012) already includes an approved HASP and SOPs for surveying and air monitoring. For the 164-166 E. Grand site we would also like to propose supplementing these procedures using the plans and SOPS that were developed and approved in the Work Plan for the Lindsay Light II Operable Unit 16 site (211 E. Grand Ave.) Docket No. V-W-01-C-960.

Please contact us if you have any questions.

Sincerely,
Steve Kornder, Ph.D.
Senior Project Geochemist
D 847.279.2448
C 262.515.7700 (New Cell Number)

AECOM
750 Corporate Woods Parkway
Vernon Hills, IL 60061
T 847.279-2500 F 847.279.2510
steve.kornder@aecom.com

Lindsay M. Scalise

From: Vincent S. Oleszkiewicz
Sent: Tuesday, December 04, 2012 4:26 PM
To: fulghum.mary@epamail.epa.gov; martwick.cathleen@epamail.epa.gov; simon.verneta@epamail.epa.gov; jablonowski.eugene@epamail.epa.gov
Cc: alex.p@ovcchicago.com; jose.m@ovcchicago.com; Korder, Steve
Subject: 164 E. Grand - Request to Proceed Pursuant to 211 E. Grand Work Plan

Mary and Cathy -

As we discussed, please see the email below from Steve Korder requesting approval of the Remedial Work Plan for 164 E. Grand Ave., which relies upon the plans and SOP's developed for the Ronald McDonald House Charities site at 211 E. Grand.
This Work Plan will be implemented to remediate the known contamination at the Site, as EPA has required in your email to me of yesterday December 3, 2012.

My client wants very much to proceed as soon as possible, and as early as this Saturday December 8, 2012. Please let us know if it is acceptable for us to proceed as outlined in Steve's email below. Steve will contact Verneta directly to discuss sign off verification.

Thanks for your cooperation with this.

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PLEASE NOTE OUR NEW CONTACT INFORMATION:

Vincent S. Oleszkiewicz
voleszkiewicz@leechtishman.com

LEECHTISHMAN

4225 Naperville Road, Suite 230 Lisle, IL 60532
Direct: 630.536.1172 | Mobile: 630.217.1032 | Main: 630.505.1600 | Fax: 630.505.1608
leechtishman.com

Results Matter. EXPECT MORE.

From: Korder, Steve [mailto:Steve.Korder@aecom.com]
Sent: Tuesday, December 04, 2012 3:27 PM
To: Vincent S. Oleszkiewicz
Cc: Alex Polanco
Subject: 164 Grand - Request to Use 211 E Grand Work Plan

As discussed earlier today, we would like to proceed with remediation of the known contamination utilizing the methods and SOPs that have historically been used for Streeterville projects. A schedule for conducting the work is currently being developed, and with USEPA approval of the methods and procedures, the remediation could potentially occur as early as Saturday December 8. It is anticipated that the work can potentially be completed within a single day and arrangements for sign-off of the remediated areas will have to be discussed. Once the areas are remediated and signed off by USEPA, we would like to proceed immediately with the backfilling of the excavations and creation of a level

interior grade in order to allow the interior masonry work to continue. The Interim Response Action Letter approved for the site (dated October 29, 2012) already includes an approved HASP and SOPs for surveying and air monitoring. For the 164-166 E. Grand site we would also like to propose supplementing these procedures using the plans and SOPS that were developed and approved in the Work Plan for the Lindsay Light II Operable Unit 16 site (211 E. Grand Ave.) Docket No. V-W-01-C-960.

Please contact us if you have any questions.

Sincerely,

Steve Kornder, Ph.D.
Senior Project Geochemist
D 847.279.2448
C 262.515.7700 (New Cell Number)

AECOM
750 Corporate Woods Parkway
Vernon Hills, IL 60061
T 847.279-2500 F 847.279.2510
steve.kornder@aecom.com

EXHIBIT D
Completion Letter

COOK COUNTY
RECORDER OF DEEDS
SCANNED BY_____

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF: SE-5J

February 7, 2014

Mr. Jose Maldonado, President
Old Veteran Construction, Inc.
10942 South Halsted
Chicago, IL 60628

Dr. Steven Kornder
AECOM
750 Corporate Woods Parkway
Vernon Hills, Illinois 60061

RE: Completion of Work Under ASAOC Docket # V-W-13-C-002 (AKA 164 East Grand Avenue, Chicago, Illinois/Lindsay Light II Site, Site ID # 05YT OU20)

Dear Mr. Maldonado and Dr. Kornder:

On October 29, 2012, the United States Environmental Protection Agency (U.S. EPA) entered into an Administrative Settlement Agreement on Consent (ASAOC) Docket # V-W-13-C-002 with Standard Bank & Trust Co., as Trustee under Illinois Trust Number 21032, dated May 18, 2011 (Trust), in which the Trust agreed to perform specified activities including soil screening, removal and other activities ("the Work") at 164 East Grand Avenue, Chicago, Illinois (Site) and to reimburse U.S. EPA response costs associated with this Site. U.S. EPA and the Trust entered into an ASAOC because an Action Memorandum documented U.S. EPA's determination that radioactive materials present at the Site posed an imminent and substantial threat to the public health and the environment and explained the need for a time-critical removal action based on the impending development of the Site.

The terms of the ASAOC required that the Trust remove, transport and dispose of off-site all soils investigated that exceeded U.S. EPA's cleanup standard of 7.1 picoCuries per gram total radium (Ra226 and Ra228) established for Lindsay Light II. The ASAOC also provided that if the Trust did not radiologically investigate the entire Site or remediate thorium from the entire Site, then the Trust would establish U.S. EPA-approved institutional controls to control exposure to and release of thorium contamination. Those institutional controls will consist of an U.S. EPA

approved Environmental Covenant pursuant to the Uniform Environmental Covenants Act (765 ILCS Ch. 122), which will be recorded against the title to the Site. Pursuant to the ASAOC, the Trust submitted a work plan that U.S. EPA approved on December 6, 2012. On November 6, 2012, AECOM, the Trust's environmental consultant initiated the Work on 164 East Grand Avenue, which consisted of surveying a soil pile, while U.S. EPA reviewed the work plan.

Once the work plan was approved, U.S. EPA went to the Site on December 8, 2012, to perform radiological surveys and collect verification samples. Since December 8, 2012, U.S. EPA has made unannounced visits and has received several permits for work to be performed in either the Grand Avenue or St. Clair Street right-of-ways (ROW). Those right-of-ways are depicted in previously submitted ROW reports dated August 13, 2013, September 25, 2013, November 8, 2013, and either titled "Right of Way Utility Excavation at 554 North St. Clair Street" or "Right of Way Utility Excavation at 164 East Grand Avenue." The Trust completed its construction activities at 164 East Grand on or about December 1, 2013. If the Trust, its successors, assigns or trustee(s), conducts additional Work in the right-of-ways, then the Trust, its successors, assigns or trustee(s), will submit the documentation that the Work in the rights-of-ways has been completed. To be clear, this letter is to document the completion of the remediation work within the boundaries of the 164 East Grand Trust-owned property.

On February 3, 2014, AECOM submitted a Final Report meeting the requirements of Paragraph 21 of the ASAOC and documenting completion of the Work as required on 164 East Grand. The Final Report included documentation that the Trust shipped 12 cubic yards of thorium contaminated soil to U.S. Ecology in Grandview, Idaho, a disposal facility licensed to accept radioactive wastes, in accordance with Paragraphs 22 of the ASAOC. The Final Report also noted that the Trust did not screen the entirety of the fill materials at the Site in 18-inch lifts and it left radiologically-contaminated soils in place at the Site to avoid potentially undermining adjacent footings and sidewalks.

Accordingly, further radiological investigation in accordance with the U.S. EPA approved work plan will be required if excavation, exposure or intrusion is conducted at the Site in areas not previously screened or in areas of known radiological contamination and in any of the 164 East Grand rights-of-ways, including the Grand Avenue and St. Clair Street rights-of-ways. If subsurface soils are exposed or intruded upon and if radiological contamination is identified, that contaminated material must be properly managed and disposed of. As stated above, this letter reflects U.S. EPA's determination in accordance with Paragraph 79 of the ASAOC that the Trust has completed the Work on its property required by the ASAOC, with the exception of certain continuing obligations required by the ASAOC. The Trust has completed the removal of all radioactive materials that exceeded U.S. EPA's cleanup standard in the portions of the Trust-owned property that were radiologically investigated and accessible. Also, as noted in the preceding paragraph, the Trust did not radiologically investigate the entire Site and left

contaminated soil in-place. Accordingly, as one of the continuing obligations required by the ASAOC, the Trust is required to establish U.S. EPA-approved institutional controls to control exposure to and release of thorium contamination that is present at the Site and that may be present at the portions of the Site that were not radiologically investigated. U.S. EPA, therefore, anticipates no need to take additional investigatory or cleanup action at this property unless new information warranting further Superfund consideration or conditions not previously known to U.S. EPA regarding the property are discovered.

This notice of completion in no way releases the Trust from any potential future obligations to perform additional work to address the same, or other, conditions at the Site should such work be the subject of a future U.S. EPA Administrative Order. Similarly, this notice of completion does not release the Trust from any recordkeeping, payment (including payment of certain response costs in accordance with Paragraph 40 of the ASAOC), or other obligations under the ASAOC that extend beyond the date of this notice.

Please contact me at (312) 886-3601, or Eugene Jablonowski, Superfund Health Physicist at (312) 886-4591, and direct legal inquiries to Mary Fulghum, Associate Regional Counsel at (312) 886-4683 or Cathleen Martwick, Associate Regional Counsel at (312) 886-7166, if have questions concerning this letter.

Sincerely,

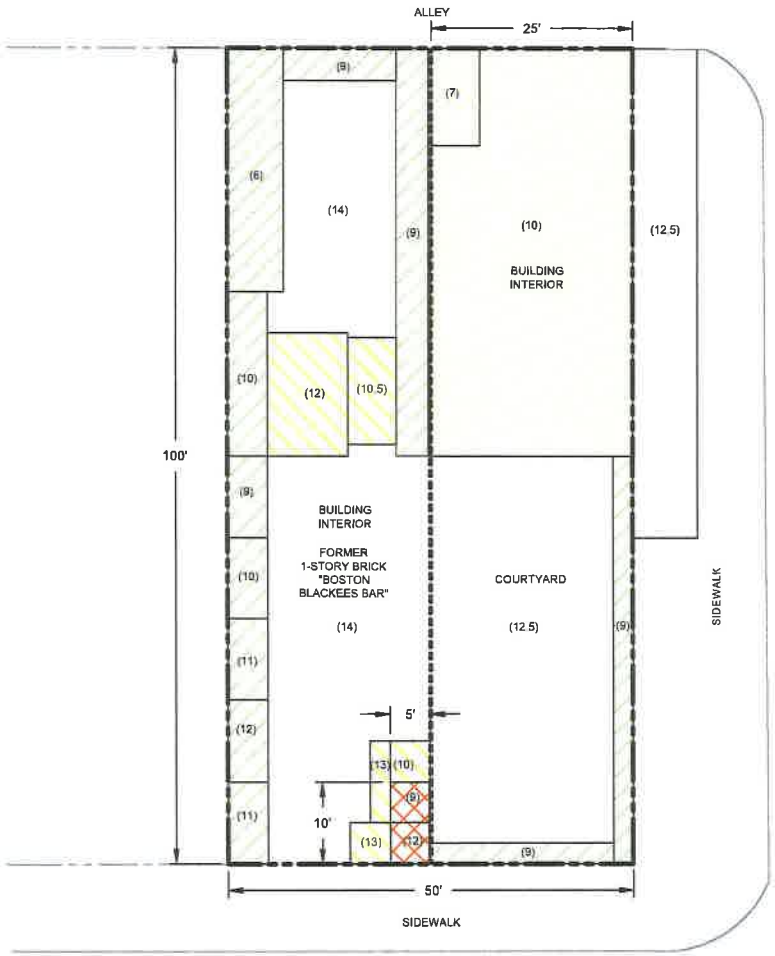
Verneta Simon

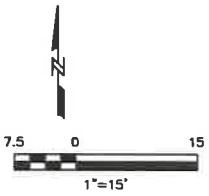
Verneta Simon, P.E.
On-Scene Coordinator

cc: Mort Ames, City of Chicago Department of Law
Thomas Baughman, Illinois Department of Public Health
John Kim, Illinois EPA
Adnan Khayyat, IEMA
Vince Oleszkiewicz, Leech Tishman
Terry Sheahan, City of Chicago Department of Health
Kimberly Worthington, City of Chicago Department of Fleet & Facility Management

EXHIBIT E
Map of Uninvestigated Site Area

COOK COUNTY
RECORDER OF DEEDS
SCANNED BY_____





Legend

- SURFACE SURVEYED AFTER FLOOR SLAB OR PAVEMENT REMOVED
- TRENCH EXCAVATION
- ELEVATOR PIT EXCAVATION
- CAISSON AND GRADE BEAM EXCAVATION AREA, CAISSONS EXCAVATED AND SCREENED TO NATIVE SAND
- POST SIDEWALK SLAB REMOVAL SURVEY
- RADIOLOGICALLY CONTAMINATED SOIL REMEDIATION EXCAVATION
- AREA WITH RADIOLOGICALLY CONTAMINATED SOIL REMAINING IN-PLACE ABOVE USEPA CLEAN-UP VALUE OF 7.1 pCi/g
- SITE PROPERTY BOUNDARY
- EASTERN WALL OF FORMER BUILDING
- CURB

NOTES:

1. VALUES IN PARENTHESES ARE THE POST EXCAVATION FINAL SCREENING ELEVATION IN FEET CHICAGO CITY DATUM (CCD)
2. NEW BUILDING 1st FLOOR SLAB ELEVATION IS 14.68 FT CCD.
3. THE UNINVESTIGATED AREAS/FILL SOILS ARE THOSE BETWEEN THE FINAL ESCAVATION DEPTH AND THE NATIVE SAND. THE DEPTH TO NATIVE SAND VARIES BASED ON FORMER STRUCTURES.

NO.	DRWN	DATE	REVISION	CHKD	DATE	APPVD	DATE
7							
6							
5							
4							
3							
2							
1							

AECOM

AECOM
750 Corporate Woods Pkwy Vernon Hills, Illinois 60061
Phone: 847-279-2500 Fax: 847-279-2510
www.aecom.com

164 East Grand Ave
Chicago, Illinois

PROJ. NUMBER: 60279661.6

DATE: 12/10/2013

Map of Radiological Screening Results and Uninvestigated Site Areas

DRAWING NUMBER: 3

SHEET NUMBER

REVISION

EXHIBIT F
Title Policy

COOK COUNTY
RECORDER OF DEEDS
SCANNED BY_____

COOK COUNTY
RECORDER OF DEEDS
SCANNED BY_____

OWNER'S POLICY OF TITLE INSURANCE

Issued by

CHICAGO TITLE INSURANCE COMPANY

Any notice of claim and any other notice or statement in writing required to be given to the Company under this Policy must be given to the Company at the address shown in Section 18 of the Conditions.

COVERED RISKS

SUBJECT TO THE EXCLUSIONS FROM COVERAGE, THE EXCEPTIONS FROM COVERAGE CONTAINED IN SCHEDULE B, AND THE CONDITIONS, CHICAGO TITLE INSURANCE COMPANY, a Nebraska coporation (the "Company") insures, as of Date of Policy and, to the extent stated in Covered Risks 9 and 10, after Date of Policy, against loss or damage, not exceeding the Amount of Insurance, sustained or incurred by the Insured by reason by:

1. Title being vested other than as stated in Schedule A.
2. Any defect in or lien or encumbrance on the Title. This Covered Risk includes but is not limited to insurance against loss from
   (a) A defect in the Title caused by
      (i) forgery, fraud, undue influence, duress, incompetency, incapacity, or impersonation;
      (ii) failure of any person or Entity to have authorized a transfer or conveyance;
      (iii) a document affecting Title not properly created, executed, witnessed, sealed, acknowledged, notarized, or delivered;
      (iv) failure to perform those acts necessary to create a document by electronic means authorized by law;
      (v) a document executed under a falsified, expired, or otherwise invalid power of attorney;
      (vi) a document not properly filed, recorded, or indexed in the Public Records including failure to perform those acts by electronic means authorized by law; or
      (vii) a defective judicial or administrative proceeding.
   (b) The lien of real estate taxes or assessments imposed on the Title by a governmental authority due or payable, but unpaid.
   (c) Any encroachment, encumbrance, violation, variation, or adverse circumstance affecting the Title that would be disclosed by an accurate and complete land survey of the Land. The term "encroachment" includes encroachments of existing improvements located on the Land onto adjoining land, and encroachments onto the Land of existing improvements located on adjoining land.
3. Unmarketable Title.
4. No right of access to and from the Land.
5. The violation or enforcement of any law, ordinance, permit, or governmental regulation (including those relating to building and zoning) restricting, regulating, prohibiting, or relating to
   (a) the occupancy, use, or enjoyment of the Land;
   (b) the character, dimensions, or location of any improvement erected on the Land;
   (c) the subdivision of land; or
   (d) environmental protection

   if a notice, describing any part of the Land, is recorded in the Public Records setting forth the violation or intention to enforce, but only to the extent of the violation or enforcement referred to in that notice.

OWNER'S POLICY (2006)

6. An enforcement action based on the exercise of a governmental police power not covered by Covered Risk 5 if a notice of the enforcement action, describing any part of the Land, is recorded in the Public Records, but only to the extent of the enforcement referred to in that notice.
7. The exercise of the rights of eminent domain if a notice of the exercise, describing any part of the Land, is recorded in the Public Records.
8. Any taking by a governmental body that has occurred and is binding on the rights of a purchaser for value without Knowledge.
9. Title being vested other than as stated Schedule A or being defective
   (a) as a result of the avoidance in whole or in part, or from a court order providing an alternative remedy, of a transfer of all or any part of the title to or any interest in the Land occurring prior to the transaction vesting Title as shown in Schedule A because that prior transfer constituted a fraudulent or preferential transfer under federal bankruptcy, state insolvency, or similar creditors' rights laws; or
   (b) because the instrument of transfer vesting Title as shown in Schedule A constitutes a preferential transfer under federal bankruptcy, state insolvency, or similar creditors' rights laws by reason of the failure of its recording in the Public Records
      (i) to be timely, or
      (ii) to impart notice of its existence to a purchaser for value or to a judgment or lien creditor.
10. Any defect in or lien or encumbrance on the Title or other matter included in Covered Risks 1 through 9 that has been created or attached or has been filed or recorded in the Public Records subsequent to Date of Policy and prior to the recording of the deed or other instrument of transfer in the Public Records that vests Title as shown in Schedule A.

The Company will also pay the costs, attorneys' fees, and expenses incurred in defense of any matter insured against by this Policy, but only to the extent provided in the Conditions.

IN WITNESS WHEREOF, CHICAGO TITLE INSURANCE COMPANY has caused this policy to be signed and sealed by it duly authorized officers.

CHICAGO TITLE INSURANCE COMPANY

By: Raymond R. Quirk
President

By: Michael Gravelle
Secretary

Countersigned

Authorized Signatory

OWNER'S POLICY (2006)

SCHEDULE A

POLICY NUMBER: 1401 - 008497627 - D2

DATE OF POLICY: JUNE 14, 2011

AMOUNT OF INSURANCE: $1,650,000.00

1. NAME OF INSURED:

   STANDARD BANK AND TRUST CO., AS TRUSTEE UNDER TRUST AGREEMENT DATED MAY 18, 2011 KNOWN AS TRUST NUMBER 21032.

2. THE ESTATE OR INTEREST IN THE LAND THAT IS INSURED BY THIS POLICY IS:
   FEE SIMPLE

3. TITLE IS VESTED IN:

   THE INSURED

4. THE LAND HEREIN DESCRIBED IS ENCUMBERED BY THE FOLLOWING MORTGAGE OR TRUST DEED AND ASSIGNMENTS:

   NONE

THIS POLICY VALID ONLY IF SCHEDULE B IS ATTACHED

CHICAGO TITLE INSURANCE COMPANY
OWNER'S POLICY (2006)
SCHEDULE A (CONTINUED)

POLICY NUMBER: 1401 - 008497627 - D2

5. THE LAND REFERRED TO IN THIS POLICY IS DESCRIBED AS FOLLOWS:

PARCEL 1:

LOT 4 IN ASSESSOR'S DIVISION OF THE SOUTH 1/2 OF THE EAST 100 FEET OF THE NORTH 1/2 OF BLOCK 21 IN KINZIE'S ADDITION TO CHICAGO BEING A SUBDIVISION OF THE NORTH FRACTIONAL 1/2 OF SECTION 10, TOWNSHIP 39 NORTH, RANGE 14, EAST OF THE THIRD PRINCIPAL MERIDIAN, IN COOK COUNTY, ILLINOIS.

PARCEL 2:

LOT 3 IN ASSESSOR'S DIVISION OF THE SOUTH 1/2 OF THE EAST 100 FEET OF THE NORTH 1/2 OF BLOCK 21 IN KINZIE'S ADDITION TO CHICAGO BEING A SUBDIVISION OF THE NORTH FRACTIONAL 1/2 OF SECTION 10, TOWNSHIP 39 NORTH, RANGE 14, EAST OF THE THIRD PRINCIPAL MERIDIAN, IN COOK COUNTY, ILLINOIS.

THIS POLICY VALID ONLY IF SCHEDULE B IS ATTACHED

CHICAGO TITLE INSURANCE COMPANY

OWNER'S POLICY (2006)
SCHEDULE B

POLICY NUMBER: 1401 - 008497627 - D2

EXCEPTIONS FROM COVERAGE

THIS POLICY DOES NOT INSURE AGAINST LOSS OR DAMAGE, THE COMPANY WILL NOT PAY COSTS, ATTORNEY'S FEES OR EXPENSES THAT ARISE BY REASON OF:

GENERAL EXCEPTIONS:

(1) RIGHTS OR CLAIMS OF PARTIES IN POSSESSION NOT SHOWN BY PUBLIC RECORDS.

(2) ANY ENCROACHMENT, ENCUMBRANCE, VIOLATION, VARIATION, OR ADVERSE CIRCUMSTANCE AFFECTING THE TITLE THAT WOULD BE DISCLOSED BY AN ACCURATE AND COMPLETE LAND SURVEY OF THE LAND.

(3) EASEMENTS, OR CLAIMS OF EASEMENTS, NOT SHOWN BY PUBLIC RECORDS.

(4) ANY LIEN, OR RIGHT TO A LIEN, FOR SERVICES, LABOR OR MATERIAL HERETOFORE OR HEREAFTER FURNISHED, IMPOSED BY LAW AND NOT SHOWN BY THE PUBLIC RECORDS.

(5) TAXES OR SPECIAL ASSESSMENTS WHICH ARE NOT SHOWN AS EXISTING LIENS BY THE PUBLIC RECORDS:

AA 6.

1. TAXES FOR THE YEAR(S) 2010 AND 2011
2011 TAXES ARE NOT YET DUE OR PAYABLE.

1A. NOTE: 2010 FINAL INSTALLMENT NOT YET DUE OR PAYABLE

PERM TAX#	PCL	YEAR	1ST INST	STAT
17-10-122-016-0000	1 OF 2	2010	$20,368.85	PAID
THIS TAX NUMBER AFFECTS LOT 4				
17-10-122-017-0000	2 OF 2	2010	$2,144.19	PAID
THIS TAX NUMBER AFFECTS LOT 3				

* *

C 7. THE LAND LIES WITHIN THE BOUNDARIES OF A SPECIAL SERVICE AREA AS DISCLOSED BY ORDINANCE RECORDED AS DOCUMENT 91075841, AND IS SUBJECT TO ADDITIONAL TAXES UNDER THE TERMS OF SAID ORDINANCE AND SUBSEQUENT RELATED ORDINANCES.

AB 8. POSSIBLE PARTY WALL AND PARTY WALL RIGHTS OF THE OWNERS OF THE PROPERTY TO THE WEST AND ADJOINING, AS DISCLOSED BY SURVEY DATED MAY 31, 2011 PREPARED BY MM SURVEYING CO., INC. ORDER NO. 77807, AND ANY AND ALL POSSIBLE RIGHTS AND OBLIGATIONS RELATING THERETO.

AC 9. WE HAVE EXAMINED THE PLAT OF SURVEY BY SURVEY DATED MAY 31, 2011 PREPARED BY MM SURVEYING CO., INC, ORDER NO. 77807 AND NOTE THE FOLLOWING:

EXCEPTIONS FROM COVERAGE (CONTINUED)

(1) ENCROACHMENT OF THE BUILDING LOCATED MAINLY ON THE LAND ONTO PUBLIC PROPERTY NORTH AND ADJOINING BY .38 FEET AND ONTO PROPERTY WEST AND ADJOINING BY .02 FEET AT THE NORTHWEST CORNER AND BY .23 FEET AT THE SOUTHWEST CORNER.

(2) ENCROACHMENT OF THE CANOPY ON THE BUILDING LOCATED ON THE LAND ONTO PUBLIC PROPERTY SOUTH AND ADJOINING BY UP TO 6 FEET.

AD 10. TERMS, POWERS, PROVISIONS AND LIMITATIONS OF THE TRUST UNDER WHICH TITLE TO THE LAND IS HELD.

CHICAGO TITLE INSURANCE COMPANY

POLICY SIGNATURE PAGE

POLICY NUMBER: 1401 - 008497627 - D2

THIS POLICY SHALL NOT BE VALID OR BINDING UNTIL SIGNED BY AN AUTHORIZED SIGNATORY.

CHICAGO TITLE INSURANCE COMPANY

BY _____
AUTHORIZED SIGNATORY

ENDORSEMENT

ATTACHED TO AND FORMING A PART OF
POLICY NUMBER: 1401 - 00849627 - D2

ISSUED BY

CHICAGO TITLE INSURANCE COMPANY

POLICY MODIFICATION ENDORSEMENT 4

GENERAL EXCEPTION NUMBER(S) 1 THROUGH 5 OF SCHEDULE B OF THIS POLICY ARE HEREBY DELETED.

THIS ENDORSEMENT IS MADE A PART OF THE POLICY AND IS SUBJECT TO ALL OF THE TERMS AND PROVISIONS THEREOF AND OF ANY PRIOR ENDORSEMENTS THERETO. EXCEPT TO THE EXTENT EXPRESSLY STATED, IT NEITHER MODIFIES ANY OF THE TERMS AND PROVISIONS OF THE POLICY AND ANY PRIOR ENDORSEMENTS, NOR DOES IT EXTEND THE EFFECTIVE DATE OF THE POLICY AND ANY PRIOR ENDORSEMENTS, NOR DOES IT INCREASE THE FACE AMOUNT THEREOF.

LAK

EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy, and the Company will not pay loss or damage, costs, attorneys' fees, or expenses that arise by reason of:

1. (a) Any law, ordinance, permit, or governmental regulation (including those relating to building and zoning) restricting, regulating, prohibiting, or relating to
   (i) the occupancy, use, or enjoyment of the Land;
   (ii) the character, dimensions or location of any improvement erected on the Land;
   (iii) the subdivision of land; or
   (iv) environmental protection,
   or the effect of any violation of these laws, ordinances, or governmental regulations. This Exclusion 1(a) does not modify or limit the coverage provided under Covered Risk 5.
   (b) Any governmental police power. This Exclusion 1(b) does not modify or limit the coverage provided under Covered Risk 6.
2. Rights of eminent domain. This Exclusion does not modify or limit the coverage provided under Covered Risk 7 or 8.
3. Defects, liens, encumbrances, adverse claims, or other matters:
   (a) created, suffered, assumed, or agreed to by the Insured Claimant;
   (b) not Known to the Company, not recorded in the Public Records at Date of Policy, but Known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;
   (c) resulting in no loss or damage to the Insured Claimant;
   (d) attaching or created subsequent to Date of Policy (however, this does not modify or limit the coverage provided under Covered Risk 9 and 10); or
   (e) resulting in loss or damage that would not have been sustained if the Insured Claimant had paid value for the Title.
4. Any claim, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that the transaction vesting the Title as shown in Schedule A, is
   (a) a fraudulent conveyance or fraudulent transfer; or
   (b) a preferential transfer for any reason not stated in Covered Risk 9 of this policy.
5. Any lien on the Title for real estate taxes or assessments imposed by governmental authority and created or attaching between Date of Policy and the date of recording of the deed or other instrument of transfer in the Public Records that vests Title as shown in Schedule A.

CONDITIONS

1. **DEFINITION OF TERMS**
   The following terms when used in this policy mean:
   (a) "Amount of Insurance": The amount stated in Schedule A, as may be increased or decreased by endorsement to this policy, increased by Section 8(b), or decreased by Sections 10 and 11 of these Conditions.
   (b) "Date of Policy": The date designated as "Date of Policy" in Schedule A.
   (c) "Entity": A corporation, partnership, trust, limited liability company, or other similar legal entity.
   (d) "Insured": The Insured named in Schedule A.
      (i) The term "Insured" also includes
         (A) successors to the Title of the Insured by operation of law as distinguished from purchase, including heirs, devisees, survivors, personal representatives, or next of kin;
         (B) successors to an Insured by dissolution, merger, consolidation, distribution, or reorganization;
         (C) successors to an Insured by its conversion to another kind of Entity;
         (D) a grantee of an Insured under a deed delivered without payment of actual valuable consideration conveying the Title
            (1) if the stock, shares, memberships, or other equity interests of the grantee are wholly-owned by the named Insured,
            (2) if the grantee wholly owns the named Insured,
            (3) if the grantee is wholly-owned by an affiliated Entity of the named Insured, provided the affiliated Entity and the named Insured are both wholly-owned by the same person or Entity, or
            (4) if the grantee is a trustee or beneficiary of a trust created by a written instrument established by the Insured named in Schedule A for estate planning purposes.
      (ii) With regard to (A), (B), (C), and (D) reserving, however, all rights and defenses as to any successor that the Company would have had against any predecessor Insured.
   (e) "Insured Claimant": An Insured claiming loss or damage.
   (f) "Knowledge" or "Known": Actual knowledge, not constructive knowledge or notice that may be imputed to an Insured by reason of the Public Records or any other records that impart constructive notice of matters affecting the Title.
   (g) "Land": The land described in Schedule A, and affixed improvements that by law constitute real property. The term "Land" does not include any property beyond the lines of the area described in Schedule A, nor any right, title, interest, estate, or easement in abutting streets, roads, avenues, alleys, lanes, ways, or waterways, but this does not modify or limit the extent that a right of access to and from the Land is insured by this policy.
   (h) "Mortgage": Mortgage, deed of trust, trust deed, or other security instrument, including one evidenced by electronic means authorized by law.
   (i) "Public Records": Records established under state statutes at Date of Policy for the purpose of imparting constructive notice of matters relating to real property to purchasers for value and without Knowledge. With respect to Covered Risk 5(d), "Public Records" shall also include environmental protection liens filed in the records of the clerk of the United States District Court for the district where the Land is located.
   (j) "Title": The estate or interest described in Schedule A.
   (k) "Unmarketable Title": Title affected by an alleged or apparent matter that would permit a prospective purchaser or lessee of the Title or lender on the Title to be released from the obligation to purchase, lease, or lend if there is a contractual condition requiring the delivery of marketable title.
2. **CONTINUATION OF INSURANCE**
   The coverage of this policy shall continue in force as of Date of Policy in favor of an Insured, but only so long as the Insured retains an estate or interest in the Land, or holds an obligation secured by a purchase money Mortgage given by a purchaser from the Insured, or only so long as the Insured shall have liability by reason of warranties in any transfer or conveyance of the Title. This policy shall not continue in force in favor of any purchaser from the Insured of either (i) an estate or interest in the Land, or (ii) an obligation secured by a purchase money Mortgage given to the Insured.

3. NOTICE OF CLAIM TO BE GIVEN BY INSURED CLAIMANT
The Insured shall notify the Company promptly in writing (i) in case of any litigation as set forth in Section 5(a) of these Conditions, (ii) in case Knowledge shall come to an Insured hereunder of any claim of title or interest that is adverse to the Title, as insured, and that might cause loss or damage for which the Company may be liable by virtue of this policy, or (iii) if the Title, as insured, is rejected as Unmarketable Title. If the Company is prejudiced by the failure of the Insured Claimant to provide prompt notice, the Company's liability to the Insured Claimant under the policy shall be reduced to the extent of the prejudice.

4. PROOF OF LOSS
In the event the Company is unable to determine the amount of loss or damage, the Company may, at its option, require as a condition of payment that the Insured Claimant furnish a signed proof of loss. The proof of loss must describe the defect, lien, encumbrance, or other matter insured against by this policy that constitutes the basis of loss or damage and shall state, to the extent possible, the basis of calculating the amount of the loss or damage.

5. DEFENSE AND PROSECUTION OF ACTIONS
(a) Upon written request by the Insured, and subject to the options contained in Section 7 of these Conditions, the Company, at its own cost and without unreasonable delay, shall provide for the defense of an Insured in litigation in which any third party asserts a claim covered by this policy adverse to the Insured. This obligation is limited to only those stated causes of action alleging matters insured against by this policy. The Company shall have the right to select counsel of its choice (subject to the right of the Insured to object for reasonable cause) to represent the Insured as to those stated causes of action. It shall not be liable for and will not pay the fees of any other counsel. The Company will not pay any fees, costs, or expenses incurred by the Insured in the defense of those causes of action that allege matters not insured against by this policy.
(b) The Company shall have the right, in addition to the options contained in Section 7 of these Conditions, at its own cost, to institute and prosecute any action or proceeding or to do any other act that in its opinion may be necessary or desirable to establish the Title, as insured, or to prevent or reduce loss or damage to the Insured. The Company may take any appropriate action under the terms of this policy, whether or not it shall be liable to the Insured. The exercise of these rights shall not be an admission of liability or waiver of any provision of this policy. If the Company exercises its rights under this subsection, it must do so diligently.
(c) Whenever the Company brings an action or asserts a defense as required or permitted by this policy, the Company may pursue the litigation to a final determination by a court of competent jurisdiction, and it expressly reserves the right, in its sole discretion, to appeal any adverse judgment or order.

6. DUTY OF INSURED CLAIMANT TO COOPERATE
(a) In all cases where this policy permits or requires the Company to prosecute or provide for the defense of any action or proceeding and any appeals, the Insured shall secure to the Company the right to so prosecute or provide defense in the action or proceeding, including the right to use, at its option, the name of the Insured for this purpose. Whenever requested by the Company, the Insured, at the Company's expense, shall give the Company all reasonable aid (i) in securing evidence, obtaining witnesses, prosecuting or defending the action or proceeding, or effecting settlement, and (ii) in any other lawful act that in the opinion of the Company may be necessary or desirable to establish the Title or any other matter as insured. If the Company is prejudiced by the failure of the Insured to furnish the required cooperation, the Company's obligations to the Insured under the policy shall terminate, including any liability or obligation to defend, prosecute, or continue any litigation, with regard to the matter or matters requiring such cooperation.
(b) The Company may reasonably require the Insured Claimant to submit to examination under oath by any authorized representative of the Company and to produce for examination, inspection, and copying, at such reasonable times and places as may be designated by the authorized representative of the Company, all records, in whatever medium maintained, including books, ledgers, checks, memoranda, correspondence, reports, e-mails, disks, tapes, and videos whether bearing a date before or after Date of Policy, that reasonably pertain to the loss or damage. Further, if requested by any authorized representative of the Company, the Insured Claimant shall grant its permission, in writing, for any authorized representative of the Company to examine, inspect, and copy all of these records in the custody or control of a third party that reasonably pertain to the loss or damage. All information designated as confidential by the Insured Claimant provided to the Company pursuant to this Section shall not be disclosed to others unless, in the reasonable judgment of the Company, it is necessary in the administration of the claim. Failure of the Insured Claimant to submit for examination under oath, produce any reasonably requested information, or grant permission to secure reasonably necessary information from third parties as required in this subsection, unless prohibited by law or governmental regulation, shall terminate any liability of the Company under this policy as to that claim.

7. OPTIONS TO PAY OR OTHERWISE SETTLE CLAIMS; TERMINATION OF LIABILITY
In case of a claim under this policy, the Company shall have the following additional options:
(a) To Pay or Tender Payment of the Amount of Insurance.
To pay or tender payment of the Amount of Insurance under this policy together with any costs, attorneys' fees, and expenses incurred by the Insured Claimant that were authorized by the Company up to the time of payment or tender of payment and that the Company is obligated to pay.
Upon the exercise by the Company of this option, all liability and obligations of the Company to the Insured under this policy, other than to make the payment required in this subsection, shall terminate, including any liability or obligation to defend, prosecute, or continue any litigation.
(b) To Pay or Otherwise Settle With Parties Other Than the Insured or With the Insured Claimant.
(i) To pay or otherwise settle with other parties for or in the name of an Insured Claimant any claim insured against under this policy. In addition, the Company will pay any costs, attorneys' fees, and expenses incurred by the Insured Claimant that were authorized by the Company up to the time of payment and that the Company is obligated to pay; or
(ii) To pay or otherwise settle with the Insured Claimant the loss or damage provided for under this policy, together with any costs, attorneys' fees, and expenses incurred by the Insured Claimant that were authorized by the Company up to the time of payment and that the Company is obligated to pay.
Upon the exercise by the Company of either of the options provided for in subsections (b)(i) or (ii), the Company's obligations to the Insured under this policy for the claimed loss or damage, other than the payments required to be made, shall terminate, including any liability or obligation to defend, prosecute, or continue any litigation.

8. DETERMINATION AND EXTENT OF LIABILITY
This policy is a contract of indemnity against actual monetary loss or damage sustained or incurred by the Insured Claimant who has suffered loss or damage by reason of matters insured against by this policy.
(a) The extent of liability of the Company for loss or damage under this policy shall not exceed the lesser of
(i) the Amount of Insurance; or
(ii) the difference between the value of the Title as insured and the value of the Title subject to the risk insured against by this policy.

(b) If the Company pursues its rights under Section 5 of these Conditions and is unsuccessful in establishing the Title, as insured,
   (i) the Amount of Insurance shall be increased by 10%, and
   (ii) the Insured Claimant shall have the right to have the loss or damage determined either as of the date the claim was made by the Insured Claimant or as of the date it is settled and paid.

(c) In addition to the extent of liability under (a) and (b), the Company will also pay those costs, attorneys' fees, and expenses incurred in accordance with Sections 5 and 7 of these Conditions.

9. LIMITATION OF LIABILITY

(a) If the Company establishes the Title, or removes the alleged defect, lien or encumbrance, or cures the lack of a right of access to or from the Land, or cures the claim of Unmarketable Title, all as insured, in a reasonably diligent manner by any method, including litigation and the completion of any appeals, it shall have fully performed its obligations with respect to that matter and shall not be liable for any loss or damage caused to the Insured.

(b) In the event of any litigation, including litigation by the Company or with the Company's consent, the Company shall have no liability for loss or damage until there has been a final determination by a court of competent jurisdiction, and disposition of all appeals, adverse to the Title, as insured.

(c) The Company shall not be liable for loss or damage to the Insured for liability voluntarily assumed by the Insured in settling any claim or suit without the prior written consent of the Company.

10. REDUCTION OF INSURANCE; REDUCTION OR TERMINATION OF LIABILITY

All payments under this policy, except payments made for costs, attorneys' fees, and expenses, shall reduce the Amount of Insurance by the amount of the payment.

11. LIABILITY NONCUMULATIVE

The Amount of Insurance shall be reduced by any amount the Company pays under any policy insuring a Mortgage to which exception is taken in Schedule B or to which the Insured has agreed, assumed, or taken subject, or which is executed by an Insured after Date of Policy and which is a charge or lien on the Title, and the amount so paid shall be deemed a payment to the Insured under this policy.

12. PAYMENT OF LOSS

When liability and the extent of loss or damage have been definitely fixed in accordance with these Conditions, the payment shall be made within 30 days.

13. RIGHTS OF RECOVERY UPON PAYMENT OR SETTLEMENT

(a) Whenever the Company shall have settled and paid a claim under this policy, it shall be subrogated and entitled to the rights of the Insured Claimant in the Title and all other rights and remedies in respect to the claim that the Insured Claimant has against any person or property, to the extent of the amount of any loss, costs, attorneys' fees, and expenses paid by the Company. If requested by the Company, the Insured Claimant shall execute documents to evidence the transfer to the Company of these rights and remedies. The Insured Claimant shall permit the Company to sue, compromise, or settle in the name of the Insured Claimant and to use the name of the Insured Claimant in any transaction or litigation involving these rights and remedies.

If a payment on account of a claim does not fully cover the loss of the Insured Claimant, the Company shall defer the exercise of its right to recover until after the Insured Claimant shall have recovered its loss.

(b) The Company's right of subrogation includes the rights of the Insured to indemnities, guaranties, other policies of insurance, or bonds, notwithstanding any terms or conditions contained in those instruments that address subrogation rights.

14. ARBITRATION

Either the Company or the Insured may demand that the claim or controversy shall be submitted to arbitration pursuant to the Title Insurance Arbitration Rules of the American Land Title Association ("Rules"). Except as provided in the Rules, there shall be no joinder or consolidation with claims or controversies of other persons. Arbitrable matters may include, but are not limited to, any controversy or claim between the Company and the Insured arising out of or relating to this policy, any service in connection with its issuance or the breach of a policy provision, or to any other controversy or claim arising out of the transaction giving rise to this policy. All arbitrable matters when the Amount of Insurance is $2,000,000 or less shall be arbitrated at the option of either the Company or the Insured. All arbitrable matters when the Amount of Insurance is in excess of $2,000,000 shall be arbitrated only when agreed to by both the Company and the Insured. Arbitration pursuant to this policy and under the Rules shall be binding upon the parties. Judgment upon the award rendered by the Arbitrator(s) may be entered in any court of competent jurisdiction.

15. LIABILITY LIMITED TO THIS POLICY; POLICY ENTIRE CONTRACT

(a) This policy together with all endorsements, if any, attached to it by the Company is the entire policy and contract between the Insured and the Company. In interpreting any provision of this policy, this policy shall be construed as a whole.

(b) Any claim of loss or damage that arises out of the status of the Title or by any action asserting such claim shall be restricted to this policy.

(c) Any amendment of or endorsement to this policy must be in writing and authenticated by an authorized person, or expressly incorporated by Schedule A of this policy.

(d) Each endorsement to this policy issued at any time is made a part of this policy and is subject to all of its terms and provisions. Except as the endorsement expressly states, it does not (i) modify any of the terms and provisions of the policy, (ii) modify any prior endorsement, (iii) extend the Date of Policy, or (iv) increase the Amount of Insurance.

16. SEVERABILITY

In the event any provision of this policy, in whole or in part, is held invalid or unenforceable under applicable law, the policy shall be deemed not to include that provision or such part held to be invalid, but all other provisions shall remain in full force and effect.

17. CHOICE OF LAW; FORUM

(a) Choice of Law: The Insured acknowledges the Company has underwritten the risks covered by this policy and determined the premium charged therefore in reliance upon the law affecting interests in real property and applicable to the interpretation, rights, remedies, or enforcement of policies of title insurance of the jurisdiction where the Land is located. Therefore, the court or an arbitrator shall apply the law of the jurisdiction where the Land is located to determine the validity of claims against the Title that are adverse to the Insured and to interpret and enforce the terms of this policy. In neither case shall the court or arbitrator apply its conflicts of law principles to determine the applicable law.

(b) Choice of Forum: Any litigation or other proceeding brought by the Insured against the Company must be filed only in a state or federal court within the United States of America or its territories having appropriate jurisdiction.

18. NOTICES, WHERE SENT

Any notice of claim and any other notice or statement in writing required to be given to the Company under this policy must be given to the Company at

CHICAGO TITLE INSURANCE COMPANY
National Claims Administration
P.O. Box 45023
Jacksonville, FL 32232-5023